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By C. VARLEY, Eſq;

The SECOND EDITION.

IN THREE VOLUMES.

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By N. NICKSON, in THURSDAY-MARKET, 1771.
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Ulſter 9 Counties	2836837	115539	128983	365	55	29
1 Antrim	383020	19071	20738	56	8	5
2 Armagh	170620	11261	13125	49	5	2
3 Cavan	274800	8318	9268	37	7	2
4 Down	344658	22914	26090	72	9	6
5 Donegal	630157	11097	12357	40	5	5
6 Fermanagh	224807	5478	5674	19	8	1
7 Londonderry	251510	13489	14528	38	4	3
8 Monaghan	170090	9587	10658	24	5	1
9 Tyrone	387175	14324	16545	30	4	4
Leinſter 12 Coun.	2642958	122900	127908	858	99	53
1 Catherlough	116900	5006	5444	42	5	2
2 Dublin	123784	21304	23103	87	7	4
3 Kildare	228590	8887	8555	100	10	4
4 Kilkenny	287650	11379	13231	96	9	7
5 King's Coun.	257510	8574	9294	56	11	2
6 Longford	134700	5038	6057	24	6	4
7 Louth	111180	8268	8150	50	5	5
8 Meath	326480	14277	14000	139	12	6
9 Queen's Co.	238415	10418	11226	39	8	3
10 Weſtmeath	249943	9271	9621	62	12	4
11 Wexford	315396	13015	11438	109	8	8
12 Wicklow	252410	7464	7781	54	6	4
Munſter 6 Coun.	3289932	109743	117197	740	63	26
1 Clare	428187	10014	11381	76	9	1
2 Cork	991010	43286	47334	232	19	12
3 Kerry	636905	11614	12112	84	8	3
4 Limerick	375320	17019	19380	130	10	3
5 Tipperary	599500	18325	18057	147	10	3
6 Waterford	259010	9485	8933	71	7	4
Connaught 5 Co.	2272915	47256	49966	330	43	10
1 Galway	775525	15420	15576	136	17	3
2 Leitrim	206830	4001	5156	21	5	2
3 Mayo	724640	13085	15089	73	9	1
4 Roſcommon	324370	8780	8216	59	6	3
5 Sligo	341550	5970	5929	41	6	1
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THE

INTRODUCTION.

WHAT I here preſume to offer to the public is quite foreign from matters of genius and ſpeculation. It is merely a compendium and abſtract of matters of fact, of perſonal experiments and obſervations, for a number of years; and here I deliver to you the product of all that I have gleaned, with the varying allowances and reſpective inſtructions, touching the difference of the climate, the culture, and the ſoil.

As the utmoſt of my ambition is ſimply and clearly to convey my thoughts and meaning to the ſimple and unlearned, to be uſeful to them I muſt be as plain and intelligible as my ſubject will admit. But ſhould men of improved genius, of letters and preciſion, happen to dip into this buſineſs, I truſt, that, whilſt they look down upon an author ſo much beneath them, they will have the goodneſs to pardon the defects of a writer, whoſe only aim and endeavour is to be underſtood by the farming part of the world. But if here and there they ſhould find any thing deſerving of their inſpection or more particular attention; if they ſhould find ſome grains of wheat in the midſt of my chaff, or ſmaller parcels of gold in the midſt of my droſs, the honour of having contributed in any meaſure to their advantage, will be to me a high matter of payment and gratification.

And if the ingenious reader can improve upon my hints, he will be the more praiſe-worthy. The field of improvement is large enough for every one to try his talents in. A man muſt know much, to know every thing; a general knowledge is deſired by many, but obtained by none. In ſhort, every ſtep that leads to knowledge, or improvement, is worthy of being marked with laurels of gold.

* * *

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UPON ſeeing ſo reſpectable a liſt of worthy gentlemen ſubſcribers to this work, I am glad of this opportunity to return my ſincere thanks for their kind intentions to incourage uſeful knowledge; and certain it is, that there is no ſcience which deſerves the attention of the public more than that of agriculture, a promoting of which tends towards ſerving bread, which is the ſtaff of life, to all denominations of people; and a work of this ſort muſt be barren indeed, if it do not inſtruct to the amount of its trifling purchaſe.

I am,

GENTLEMEN,

your obliged,

and moſt obedient Servant,

C. VARLEY.

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A

NEW SYSTEM OF HUSBANDRY.

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CHAP. I.

On the newly diſcovered and moſt valuable method of Trench-ploughing, by which any ſort of ground may be kept in perpetual good order, ſo as to produce good and clean crops for ever, without any other aſſiſtance of fallow or manure then what itſelf produces, &c.

HOWEVER marvelous this valuable method of trench-ploughing may appear at the head of a chapter, yet ſtrength of argument and experience gained from repeated trials, proves beyond a contradiction the truth thereof, and that it's utility extends alſo to every ſort of land, though indeed ſome may perhaps receive more benefit from it then others, yet every ſort will be amazingly improved thereby, as will appear to every candid reader, who will diveſt himſelf of partiality, and liſten to plain reaſon.

It may not be amiſs to make a diſtinction between trench-ploughing and deep ploughing, as they may both ſeem to convey the ſame meaning, tho' in fact both the method of performing the work, and the produce in the crop, are quite different.

Deep-ploughing is meant, when the ploughman turns up a thick ſod, and leaves a deep furrow or trench behind him, which is generally practiſed when a farmer ſees his land overun with weeds, (expreſſed by him dirty, which by the bye is too often thecaſe) his method then is to plough deep, to bury the weeds.

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By the word, bury, we naturally ſuppoſe he concludes them (as they certainly are) deſtructive to his crops, by feeding upon his labour; therefore as well as he knows how, wants to ſtop vegitation in them by burying, ſmothering, or killing them under a large body of earth.

Repeated experience tells him, that this method of deep ploughing in ſome degree lowers the number of theſe troubleſome enemies, which if not checked by this or ſome other method, would entirely poſſeſs themſelves of his ground, by rooting out, ſmothering, or choaking any crop he threw therein.

Now if we find by experience, that deep ploughing is in ſome degree uſeful, by deſtroying part of ſuch rubbiſh, it naturally follows, that their entire deſtruction, would redouble our ſucceſs in our crops; however by deep ploughing alone we cannot expect this advantage; for though the ſod be turned ever ſo thick, yet as it rears againſt another ſod, and lies hollow, it admits a circulation of air, which keeps vegitation alive, and forces up a mane or row of graſs or weeds in the ſeams between each furrow; therefore, I ſay, it is merely impoſſible to kill every ſort and part of weeds, ſo long as they lie within the reach of air, which is their life and ſpirit.

Indeed, if we make a fallow in a very dry ſummer, and plough deep and often, we may be ſaid to have a tolerable clean crop the year following, but in the ſecond and third crops and ſo on, we ſhall find the weeds and graſs daily gathering ſtrength again; ſo that it is evident, the fallow year did not infallibly deſtroy them, it only ſickened or retarded their growth for a ſmall time.

Docks, thiſtles, nettles, ſcuch-graſs, or by ſome called quicks, and many other roots, will grow though you turn them a thouſand times over with the plough, or any other inſtrument; yet they may be effectually not only deſtroyed, but converted to a friendly and uſeful manure, or food for other plants by trench-ploughing: therefore let us turn our eyes on this valuable method, and trace out by ſound reaſon, where their diſtruction is practicable, and the many good effects ariſing therefrom.

The word trenching is commonly made uſe of by gardeners, when they dig a piece of ground two or three ſpade grafts deep in performing of which, they firſt make a hole as deep as they propoſe to dig, then they pare off the upper ſod ſo deep as it contains any graſs or weed roots, or any ſort of rubbiſh, and throws it to the bottom of the ſaid hole or trench, together with any ſtraw or long dung, which they want to convert into rotten manure, as ſuch are not proper for a top-dreſſing.

This done, they cover it with the ſecond and third ſpade graft, ſo that the bottom of the ground, to the depth of two or three feet, now becomes the top; this is called by the gardeners trenching, though it is not practiſed ſo often as it ought, but every ſenſible experienced gardener will follow this method, as by it he kills two birds with one ſtone, as it were, for he not only throws the ſod or rubbiſh out of his way, from being obſtructive or troubleſome to him in ſowing his crops, but it is a kind of dung-hill or hot-bed under them.

Scuch-graſs, weeds, or other rubbiſh being out of their growing latitude, and for want of air, putrefy and ferment, and every fermentation cauſes a friction, which naturally brings on a heat, in proportion to the ſize of the body that actuates it.

As for inſtance, the heat of a hot bed, is in proportion to the quantity of dung put together in a heap, which if large, the heat is great alſo, and which is ſenſibly felt by putting a hand therein, and the ſtrength of the heat abates as the ſize of ſuch bodies grows leſs, till it cannot be diſcerned by the touch of the hand.

Though reaſon tells us there is a degree of heat in every body that putrefies or ferments, be it ever ſo ſmall, even till it comes to a ſingle ſtraw or fibre of a graſs root.

Philoſophical reaſon proves this, though we cannot ſenſibly feel it by handling; but to account for it.

Put two bodies together, and that which contains the greateſt degree of heat, has the greateſt ſenſe of feeling.

Likewiſe the ſenſes of our reaſon is quicker than that of our body, becauſe the former is the effect of the ſpiritual underſtanding, but the latter is only that of a corruptible body.

Suppoſe two perſons, one having a hot hand, and the other a cold one, (as is commonly expreſſed) theſe being joined together, the cold hand ſhall feel the other hot, but the hot one can diſcover no more heat in the other, than were it to handle ice; yet our reaſon proves beyond contradiction, that ſo long as blood circulates in the coldeſt hand, there is a great degree of heat therein, though the hotteſt hand could not diſcover it.

This ſmall sketch of philoſophy, is no way foreign, but rather eludes to my ject, as it ſerves to prove the utility and reaſonableneſs of cauſing a fermentation, in as great a degree as we can, by burying every ſort of ſods, weeds, or other combuſtible matter, under a ſufficient body of mold, in order to cauſe putrefaction, which naturally brings on a working or friction, that opens the particles of earth around it, which not only nouriſhes it, but affords ſufficient caveties therein to admit a communication, and an unitation of the different oils, ſalts, or ſulphurs, that each of theſe corrupted bodies, may when rotten produce, and which are as various, and differ as much in the ſort of manure, as the aſpect of the plants did from each other when in their vigour or growing ſtate, and though ſome plants, may, when rotten, produce too much acid or ſharp ſpirits; yet, when impregnated or mixed with thoſe of a more oily, ſmooth quality, one extreme checks another, and together affords a friendly maure, or food for the plants to feed upon.

In ſhort many good effects may derive from this method of covering, or burying the upper ſod, with a proper quantity of the under ſtratum, or maiden mold.

Firſt, this ſod be the ground ever ſo poor, is interwoven with various ſorts of roots, either of graſs or weeds, both of which are very obnoxious and deſtructive to any crop we can ſow therein, for they not only feed upon what ſhould nouriſh the profitable plants, but they take up the ground that ſuch plants ſhould ſtand upon and alſo hinders the free circulation of air, ſo that if not eradicated, will intirely poſſeſs themſelves of the ground; and we ſee that the beſt fallows, or deep ploughing is not capable of making a total deſtruction of ſuch enemies; at the beſt it is only half doing the work, for they ſoon recover and re-eſtabliſh themſelves, to the no ſmall mortification of the tiller.

But by covering the ſaid ſod, thus interwoven with graſs, weeds, &c. with a body of mold, we not only get quit of them as enemies, but are at the ſame time converting them into a kind of a hot bed, dunghill, and fallow.

In ſhort, by being thus buried, they act in all theſe capacities, for being covered only by ſeven or eight inches of earth, they cannot vegetate, ſuch a body incloſes them from the air, and nothing can grow without it; therefore what juices they contain, immediately begins to ſweat, ferment, and putrefy, all which cauſes a friction, or working of the different ſpirits together, ſome part of which ſumegates or evaporates through the body of mold by a ſteam or ſmoak, (if we may compare great things to ſmall) in the nature of a dunghill, or hayſtack, when newly put together, and in the ſtate of fermentation, our eyes and feeling can witneſs for the latter, and ſo may our reaſon for the former. Therefore while it is in a ſtate of fermentation, it acts in ſome degree as a hot-bed, which nouriſhes and enriches the earth and plants bout it; when the ſtate of fermentation is over, it then acts as a manure, and food for plants, whoſe fibres will naturally ſtrike down to feed thereon; and what is yet farther in its favour, it may juſtly be called a fallow in reſerve, and a dunghill without labour or expence.

Yet more, it is not only for a year or two, but will hold good for ever, becauſe the ſod that is trench-ploughed under this year, will be effectually rotten and mellow, ready for turning up the next, and when it is turned up, you turn down another weedy ſod, or furrow in its place, and thus go on alternately, turning up a dead rich mellow mold, and down in its place a tired, weedy, or a graſſy ſod.

I am certain that when this practice is thoroughly adapted, no manure or fallow need ever be applied, as none can be ſo good as ſuch a dreſſing.

Nevertheleſs I do not exclude marling, claying, or ſanding, theſe are generally put on to change the ſtaple or nature of the ground, and may be as uſeful in this, as any other ſort of tillage, but ſhall refer my reader to the chapters that treat on theſe articles; and it may not be amiſs, before I quit this chapter, to clear up a doubt which I ſee ariſe in my reader, in regard of killing all ſorts of weeds by burying; for ſays he, quicks or ſcuch-graſs, docks, nettles, thiſtles, and ſuch ſort of roots, will grow or ſtrike downwards, perhaps two feet or more, therefore how can they be buried or killed with ploughing a dozen or ſixteen inches only?

My reader is to conſider that theſe, no more than every other vegetable, can live or vegetate without a ſufficient quantity of air, and though a tap-rooted plant may ſtrike downwards ever ſo far under ground, yet air is conveyed to every part thereof, by the tubes, veins, or leaders, taking in air by the external parts or top of the plants, and which ſerves not only as mouths to take in nouriſhment, but as air-pipes to convey air to every part of the root, in order to keep vegetation alive.

But on the other hand, if ſix or eight inches of the top of any ſort of plant be taken off within the ground, and the remainder of the root covered with ſo many inches of mold, it will effectually ſmother and ſtop it from growing, as a few inches of earth over the crown of a plant, of any kind will ſtop the circulation of air, therefore cauſe a deſtruction of the root.

It is with the vegetable as with the animal creation, for neither can ſubſiſt without air; a land animal will live when put into water, provided the mouth or noſtrils be above the ſurface, but if theſe be covered with water only an inch, then the creature drowns, becauſe this body of water keeps out the air from circulating to other parts of the body of the animal.

Thus it is with weeds or plants of any ſort, for if any part of a plant come to the ſurface of the earth, it takes in air to keep the whole body thereof alive, whereas if the whole be covered, ſo as to exclude air from any part thereof, that plant muſt immediately die and turn to corruption.

All the difference there is between a land animal drowning with a ſmall body of water over it, and a plant requiring a larger body of earth over it, is, becauſe water being a firm body, and a ſmooth glaſſy ſurface, therefore a thin ſheet thereof will exclude air from entering therein; but earth when under tillage breaks into lumps or clods, and is ſometimes intermixed with ſtones, ſo conſequently keeps the mold looſe, and open, which admits air thereamong.

Therefore if the plants be not covered with ſix or eight inches of mold, they may be ſupplied with air through ſome of theſe caveties, and the rougher the ground is, the greater chance they have for to meet with this ſupply; for the finer the ground and the cloſer it falls; and to help to conſolidate it the more, it may not be amiſs to run land that is trench-ploughed over with a heavy roller; by ſuch precautions there is not the leaſt doubt but you may ſmother every ſort of weeds with ſix or eight inches of mold over them.

The worſt root that is to ſmother, as may appear to ſome tillers, is ſcuch-graſs, and yet I know from experience, that this is to be effectually ſmothered by trench-ploughing, provided that the firſt plough go to the bottom of it, and turn the root all to the bottom of the trench, ſo that the ſecond furrow raiſed be all maiden earth, and thrown cleverly over the firſt.

This will incloſe it that no air can come at the weeds to raiſe it to vegetation. The root of ſcuch-graſs, though very long, yet it moſtly runs horizontally, keeping near the ſurface, and will interweave and mattreſs together with the ſod or furrow to ſuch a degree, that it is hard to part or break it to pieces with either plough or harrow, and is not at any rate to be deſtroyed, but by raking or picking out by mere dint of labour and expence, and ſo burned; and even in this caſe it is not to be totally deſtroyed, for if pieces no more than an inch long remain, they will grow and quickly increaſe to an immenſe degree.

In ſhort, there never was a method found out to deſtroy it equal to trench-ploughing, and with this, as with all other weeds, its deſtruction is the birth of a large portion of manure, as above obſerved.

Were I to have my choice for trench-ploughing, it ſhould fall upon the moſt graſſy or weedyeſt piece of ground I could find; the greater the quantity of ſuch rubbiſh buried, and the richer the ground would be at the next turning up.

It is not above ten months ago, ſince I entered upon a piece of ground that was over-run with weeds, which grew as high as a man, I ordered it to be mown, and the holm, together with the firſt ſod, which contained the roots, to be buried or trenched two ſpades deep; this had the deſired effect; for though this has been a wet ſummer, very few weeds grew; and I am confident if I had not taken this method, it would have coſt me as much weeding as the crop was worth. I tried the ground, and found it as rich underneath as a dunghill, comparitively ſpeakinig; every weed, both root and branch, was melted and incorporated among the mold, which has turned it black and rich paſt conception. The reaſon which firſt induced me to be ſo ſtrong an advocate for, together with the method of, trenching land, as near Glaſgow, may be read in the next chapter.

CHAP. II.

Some farther remarks on trench-ploughing, together with the method and price of trenching ground with the ſpades, as near Glaſgow, &c.

AS I ſome years ago, publiſhed a work of Husbandry, intitled *The Yorkſhire Farmer*, and as one chapter in the ſaid work relating to deep-ploughing, ſeems to claſh in ſome degree with my preſent ſubject, it may not be amiſs to clear up that point, leaſt both my works ſhould fall into one hand, and the contradiction give my reader a bad idea of my morals, by carrying as it were, two faces under one hood; but this I aſſure him is quite foreign to my principles, for I never yet ſtrove to ſupport either a verbal or written argument, but at the time my words or pen agreed with my heart.

Every man ought to lay himſelf open to conviction, but until he is convinced, he ſhould ſupport his argument with all the ſteadineſs and rhetoric he is maſter of; but if his antagoniſt, by the ſtrength of argument, good ſenſe, or quoted circumſtances, prove him wrong, he ought moſt candidly to acknowledge it, by confeſſing himſelf ſo.

Such a condeſcenſion ſhews a good diſpoſition, and generally gains more upon the hearers, than the beſt ſupported argument, when left undecided.

I muſt own, that at publiſhing my firſt works, my opinion was more in favour of ſhallow-ploughing then at preſent; it is true I was not in general for ſhallow-ploughing, I confined it to different ſoils, deep-ploughing to deep good land, and ſhallow-ploughing to thin bad land, whereas I am ſince thoroughly convinced by repeated experiments, ſtrength of argument, and reaſon itſelf, that I was wrong.

For if the land be thin, having a bad ſoil under it, is the reaſon why it ſhould be made deeper, and that by ploughing, as no other method but turning up the under ſtratum can have the deſired effect

He that is afraid of letting his plough ſink deep, for fear of turning up bad earth, is like a timerous ſurgeon who is afraid of probing a wound to the bottom; he may make a ſmooth ſurface, but the inſide will always be a thief preying upon his ſubſtance.

The land that I was till lately the moſt afraid of turning up for fear of ſpoiling, or filling my crops full of weeds, was that called ramel, a ſort of hard red ruſty earth, which generally lies near the ſurface, it runs in a cake, and where it happens the land is generally wet, for it is of ſuch a firm nature, that it will not let the water penetrate through it, but bears it up among the upper ſtratum, no tap-root plant can grow in ſuch land, even thiſtles is debarred their entrance, if any grow they are only of a poor dwarfy kind.

The thickneſs of this cake or bed of ramel is generally about three inches, and when the plough breaks through it, it riſes in large pieces, it is very obdurate in it's nature, and will take a great deal of labour in harrowing, &c. before it is ſubdued or brought to a ſeparation; but yet it is to be done, and in a year or two you looſe it, as it is mixed with the other earth.

This ramel abounds much in Cheſhire, Lancaſhire, many parts of Yorkſhire, in Norfolk, Suffolk, and in ſhort it is to be found in ſpots through the whole kingdom, and I have alſo ſeen it in Ireland, but not ſo common, as their land is generally deeper and better than in England.

It is a prevailed opinion among all the farmers I have converſed with, that this ramel ſhould not be turned up, becauſe it fills the land full of weeds, particularly thiſtles, and till lately I was of the ſame opinion, for it is ſeemingly ſo glaring a truth, that there is no contradicting it, and now I am perhaps the very firſt perſon that ever wrote in the vindication of turning it up.

But I never undertook this task, till I was thoroughly convinced both by reaſon and experience that I was right, and that for the very reaſon that thiſtles and other tap-rooted plants flouriſhes more abundantly when this bad earth is broke through and turned up, is the very reaſon why it ſhould be turned up.

Were I ſtop here, the reader would certainly either think me a mad-man or a fool to inſert ſuch a thing, ſo blind and barren is nature if not cultivated by reaſon and experience.

But the thing is plain, if we conſider it right, becauſe if we break and examine the particles of this ramel, or bad earth, we ſhall find that it contains no ſort of root, fibre, or ſeed, neither is it poſſible for thiſtle or any other plant to grow thereout, no more then out of a brick; beſides were it to produce thiſtles, or ſuch like tap-rooted luxuriant plants, it would no more be bad earth, but on the reverſe very good.

I make no doubt, but my reader has heard the tale of the blind man going to buy land, and when he kneeled him down to grope for a ſtrong thiſtle to tie his horſe to, they then told him there was none, upon which he rejected the land, rightly judging, that if there was ſtrong luxuriant thiſtles, he could not be far wrong in a purchaſe, as they always grow upon a rich deep ſoil, and the deeper and richer the land, the ſhorter and more flouriſhing is the plant, but as there was none, he had only half a chance, for though the land might be good, and the thiſtles rooted, yet there was as great a a chance that it might be bad, and not able to produce them.

Though the tale is frivolous and ſimple, yet we cannot deny but it bears a ſtrong meaning, and leads me further to prove, that it is a contradiction in nature, to imagine that this hard bricky earth, called ramel could produce them, or has the leaſt ſubſtance to aid or aſſiſt in their nouriſhment; ſo far from that, neither the roots of thiſtles, or any other vegetable can enter it, thereſore how can it contain either the root or ſeeds of weeds, and when when broke up (as is the argument of the farmers) produce them.

It is true whilſt it lies in its unmoleſted ſtate, it prevents them growing to perfection, by the ſame rule that it prevents every other profitable plant bringing forth their abundance, ſo conſequently keeps the land in its poor name, as nothing can flouriſh to perfection whilſt it lies there, becauſe it is a bar between the roots and their food which lies under it in the third ſtratum.

It is here the farmers treaſure lies hid, and it is from this that ſprings the abundance of weeds ſo complained of, which though enemies, and feed upon what would maintain profitable crops, yet they plainly prove the richneſs contained in the third ſtratum.

I do not mean that there are any roots or ſeeds of weeds in this third ſtratum, which break out and grow when the ramel is removed, no, I abſolutely deny it, as that would be impoſſible, for how could they come there, neither can any thing grow without a beginning.

Occular demonſtration ſhews us daily, that weeds of all ſorts, and partcularly thiſtles, will grow on every ſort of land, yet they may only be ſaid to flouriſh upon that which is good and deep, on ſuch they grow to a yard or four feet high perhaps, with very ſtrong ſtalks and branches, theſe ſhew the ſoil they ſtand on to afford a great deal of nouriſhment, or it could not throw up ſo much refined matter, whereof the reverſe will appear. If the land be of a poor thin ſtaple, on ſuch, though there may be a great number of thiſtles on the ground, yet their poor ſtarved dwarfy ſize makes them not appear ſo conſpicious, but however the root is there though in miniature, and when the ramel or bad ſoil is broke through, it then gives their roots liberty to ſtrike downwards, and feed plentifully on the richneſs that the third ſtratum or maiden earth contains.

Therefore what was overlooked, or ſcarce thought any thing of before, will now appear perhaps twenty times the quantity, becauſe each plant probably is twenty times the ſize; ſo that the farmer whoſe penetration goes no deeper perhaps then his eyes can ſee, may well look with amazement, and ſay he ſpoiled his ground, and made it full of weeds, though in fact the number is all the ſame, the ſize only is augmented; but I hope the above will convince him, that ſo far from ſpoiling his ground by breaking through the bad ſhell of earth, called ramel, he has only opened a paſſage for the roots to feed upon a better body of earth that lay before concealed, and that if he deſtroys the weeds, by any method (but trench-ploughing to chuſe) he may be ſure that his annual crops will alſo flouriſh in turn.

It is ſtrange how far prejudice in favour of old cuſtoms will lead one, but true it is, that I am almoſt aſhamed of my ignorance, or want of penetration, when I firſt publiſhed my *Yorkſhire Farmer*, for in that, I held a ſtrong argument againſt ploughing deep in bad land, and which was almoſt univerſally aſſented to by ſuch ſhallow farmers as myſelf; and is it not alſo as ſtrange, ſo many thouſands of people that I had converſed with on the ſubject, that I did not meet with one to contradict me or ſet me right, before I met with Mr. Baker, an Engliſh gentleman, who is patronized and encouraged by the Honourable Dublin Society, to make experiments in agriculture, and very proper he is for the purpoſe, being a very worthy, ſenſible, indefatigable man, and ought to be careſſed and encouraged by every one who wiſhes well to the cauſe.

This gentleman and I had a ſtrong argument upon the ſubject of deep and ſhallow-ploughing, (as to trench-ploughing we neither of us touched upon, as I believe we had neither of us ever tried it at that time) though Mr. Baker's argument was ſtrong and ſenſibly maintained, yet it was not deciſive, becauſe he did not bring proofs ſufficient for the purpoſe, indeed I have thought ſince, it was for want of time, for we were rather hindered in our diſcourſe; however he told me at parting, in general terms, that he would not be of my way of thinking, to plough ſhallow upon any ſort of land for a thouſand pounds.

PATENT OFFICE

In ſhort, his diſcourſe gave me ſuch a turn, that I was determined never to ſtop enquiry or trying experiments, till I had proved the affair to the bottom.

Upon which I took a tour through Ireland to every gentleman that was curious in agriculture.

I have, by great chance, met with people that would be tearing their ground up by the plough-beam away, but after a very ſlovenly manner, with the long, old, Iriſh plough, a ſad piece of machinery as can be ; when I asked the reaſon why they ploughed ſo deep? the anſwer was, becauſe the land was poor, and they had no manure for it, therefore could get no crop, except they ploughed deep to turn up freſh earth.

By enquiry, I generally found that the ſame land had been ploughed deep, at ſome former diſtant period of time, and that they ventured to plough deep, becauſe they knew the land would bear it, as it had been deep ploughed before.

Upon the whole, their ideas were confuſed, their method was partly the effect of wild chance, and not to be depended upon, however, what I did gather, joined to reaſon, ſerved to prove in favour of deep ploughing.

In the county of Wexford their land has a good deal of ramel under it, and ſome lies near the ſurface, therefore they are afraid of deep-ploughing, however I know one farmer that broke through it, and the conſequence was, that he had a great crop both of weeds and oats, when I ſee it, both of which ſhewed a great deal of richneſs in the ground, for the ſtraw of the oats was like reeds, but the weeds, particularly thiſtles, was ſo ſtrong, that I doubt they would get the better of the corn, except the farmer beſtowed much labour in weeding.

This was the firſt crop after breaking up, and I never ſaw it after.

I alſo viewed a field belonging to the earl of —— in the ſaid county, which contained a dozen or fifteen acres, which was bad, wet, and ruſhy, occaſioned by a bed of ramel or ruſty hard earth, which lay within eight or ten inches of the ſurface, and as it lay within view of his houſe, was an eye-ſore, therefore he was reſolved to enrich it at any rate or expence, but like the reſt of the farming world, was afraid of filling his land full of weeds if he broke it up, and tilled it among the corn mold.

He therefore trenched the cloſe with ſpades to ſet with potatoes, as explained in vol. 2. chap. 7. in performing of which, he at the ſame time broke up the bed of ramel, which was three or four inches thick, and carted it all off the land; this great work was going on when I was there, ſo know not the conſequence, but am clear, if it had been broke and mixed on the land, it would not have added to to the number of weeds:

The Right Honourable Lord Chief Baron Foſter, had a piece of ground at Colon, which had one of theſe ſtratums under it, the ſurface was a black earth, in the nature of a bog, or a moor covered with ling or heath, it was always wet and poutchy when reclaiming.

He could make nothing of it till he broke through the hard under-ſtratum, and limed it well, which brought it from being not worth ſix-pence an acre, to be worth four and twenty ſhillings an acre, which is the price he let it for, if I remember right.

I ſaw a good crop of oats upon the ſaid land that was quite clear of weeds, which ſhews as there was none in the ſurface, the ramel did not produce them, for the land had been a wild barren waſte aforetime.

Upon finiſhing my travels and enquiries in Ireland, and comparing notes, I found nothing to back my former opinion of ſhallow-ploughing, on the contrary, though nothing was deciſive in the favour of deep-ploughing, yet every argument ſeemed to lead that way.

Upon my return to Dublin, I fell in company with ſome Scotch merchants, our diſcourſe ran upon agriculture, one of them told me that he lived near Glaſgow, and that in his neighbourhood, the farmers went to the expence of three pounds an acre, to trench their ground, by diging two or three ſpade grafts deep, and that they found more benefit from this, then ſo much money ſpent in manure, though they could have lime or dung from the city of Glaſgow very cheap.

This account ſurprized the company, and did not fail to draw ſome cenſures upon the Scotch gentleman, as they thought he derogated from truth, concluding, that the worſt farmers in the world would not be guilty of ſuch a folly.

To be ſhort, I immediately made a journey to Scotland, and as the gentleman told us, ſo I found it, for in an open town field joining to Glaſgow, and in another about two miles diſtance from ſaid city, I found a great many labourers at work-trenching, ſome two ſpades deep and a ſhoveling, and others three ſpades and a ſhoveling, for which they are paid from forty ſhillings, to three pounds an acre, according to the depth they go; I ſaw plainly that the ſucceſs in their crops, by this method were not doubtful, for as their land had been trenched two or three years before, the earth they threw up from the bottom of the trench, was as black and rich as a garden mold.

As this work was performing in an open town field, there were ridges that belonged to farmers which never trenched their land, upon trying theſe ridges, at two or three ſpade grafts deep, we found the under-ſtratum a red hungry ſand; therefore it was evident, that by trenching the nature of the ſoil had been changed, and when the crops began to appear, it was eaſy to pick out every trenched ridge in the fields by their aſpect, being better corn and clearer of weeds.

But as I have taken notice of this

piece of husbandry in my journal through Scotland, I refer my reader to the fifth chapter, in the third volume, for a farther account thereon.

An experiment partly of the ſame nature was tried by a gentleman in one of our ſugar iſlands, but now lives near the city of York, though the diſtance is great, and the climates in theſe iſlands, much hotter than England, yet the nature of the land is nearly the ſame.

The land on which this experiment was tried, and where the ſugar-cane grows is ſand, the under-ſtratum is a hard binding gravel.

The gentleman who tried the experiment, told me, that it is ſometimes cuſtomary after they reap the firſt crop of cane, to let the land lie unmoleſted or uncultivated, and it will bring a ſecond crop, which is inferior to the firſt, yet as it is attended with leſs expence, anſwers ſometimes very well.

A plantation containing ſix acres of cane was reaped, and the land was let lie for a ſecond crop, but obſerving that it promiſed to be bad, the ſaid land was trenched to a good depth, the upper ſtratum was buried, and in it's place turned up a hard ſtrong gravel, ſo that the land had more the appearance of a gravel walk then that of a ſtaple for any thing to grow in.

This being a thing quite out of the common method, the eyes of the planters were all upon it, and the opinion of every one was, that the land was ſpoiled; ſome would have it that it would never grow any thing more, others, that it would produce a plentiful crop of thiſtles.

In ſhort, the ſix acres were planted with ſugar-cane, and contrary to all their expectations, produced a wonderful crop, which was two hogſheads and a half of ſugar each acre, beſides the offals, which more than pays all the expence.

This ſhews that trenching ground in any climate or land is profitable.

The ingenious Mr. Young's ſix months tour, has juſt fallen into my hands, I note an experiment tried in trench-plou[illegible]g by a very worthy gentleman, near Crakehill, Yorkſhire, which ſeems to corroborate with all the experiments I have tried or met with, and I cannot do greater honour to Mr. Young, than to give it to my reader in his own words which are theſe following.

The capital improvement effected in tillage, conſiſts in trench-ploughing. In 1765, was ploughed eleven acres of land, the rent of which was ſeven pounds, it was firſt cut by a paring wheel plough, worked by three horſes, then came a ſtrong wheel plough, drawn by two oxen and ſix horſes, by which means a depth of ten inches was gained, and the eleven acres was finiſhed in eighteen days; a man followed the ploughs to tread down the ſods, ſix of theſe eleven acres were ſown with barley, and produced as in the following table:

	l.	s.	d.
Six acres produced 21 quarters 3 buſhels of barley, ſold for	28	7	6
T[illegible] acres and an half were with turnips, and ſold for	14	6	1
They were fed off with ſheep, and kept 39 for 18 weeks			
Another acre of turnips was ſold for - - -	4	0	0
Beſides theſe articles, the field produced five buſhels of tares	1	0	0
Two and a half buſhels of white peaſe - - -	0	10	0
Thirty buſhels common potatoes - - -	3	0	0
Nine ditto, early at 3s. per	1	7	0
Which is per acre	4	15	5
	52	10	1

This crop is upon the whole very conſiderable, the land was before ſuppoſed to be very bad, and the rent was trifling; beſides this ſpecies of improvement has been generally ſuppoſed to operate very little at firſt, the ſourneſs of the under ſtratum of the ſoil requiring ſome time to be ſweetened and meliorated by the influences of the atmoſphere, ſo that ſuch product the firſt crop muſt be thought a very great one.

In 1766, 4 acres of this field were ſown with barley and produced 19 quarters, the price not minuted, let us collate as before 27s. per - -	25	13	0
Six acres and a half yeilded turnips, ſold at - -	16	10	0
Fifty buſhels of potatoes, at 2s. 6d. - - -	6	5	0
Which is per acre	4	8	0
	48	8	0

In 1767, the field was croped with maſlin and barley, 4 acres of the firſt produced 92 buſhels, ſold at 4 s. 6d. per	20	6	0
Six acres of barley produced 29 quarters 5 buſhels, at 23s.	34	1	2
One acre not ſowed			
Which is per acre	5	8	8
	54	7	2

This experiment, which is particularly valuable, proves in the ſtrongeſt manner the excellency of the practice. If the reſult of three years experience, does not ſatisfy the moſt cautious of cultivators, I know not what will. Our author ſtill goes on, ſays he — In 1766, the ſaid gentleman trench-ploughed in the ſame manner as before, another field of five acres, and harrowed in oats on one part of it and beans on the reſt, the croſs was, viz.

	l.	s.	d.
One hundred and ſixty-ſeven buſhels of oats, at 2s. 6d.	20	17	6
Twenty-eight buſhels of beans, at 3s. 6d. per - -	5	5	0
Which is per acre	5	5	10
	26	9	6

The above experiments give me great pleaſure, as I know the land only to be poor and of a bad nature, and more ſo, as it is a ſpecies of land I have not in my poſſeſſion to make this experiment upon.

I cannot help taking notice, that both the tryer and compiler of theſe experiments, ſeems to have no idea of the grand point, namely, that of again turning up the ſod when the roots, &c. were all rotten and turned to manure, which would certainly be the caſe, by the time the firſt crop was reaped. It appears that the ſucceſs in crops was all produced from a maiden earth, without any aſſiſtance from manure ; but if the old ſurſace had been turned up, when reſted or rotten, by an interior fallow year, the proprietor would have found it enriched beyond expectation, and might have promiſed himſelf, if poſſible, a double return, and it might have been worked with two horſes in a plough, as the land would be light and mellow, after the firſt breaking up.

Indeed I am at this time trench-ploughing ſome ſtrong clay land, and I only uſe two horſes in a plough, they ſeem to perform it with tolerable eaſe, but it will doubtleſs be much eaſier for them when trench-ploughed again.

I have had ſeveral experiments tried on different ſorts of land, and every one proves beyond a doubt, that of all the improvements that has ever been found out in agriculture, trench-ploughing is the moſt valuable.

I have two ſorts of land now under

this experiment, one is a ſtrong clay, and as far as is tried, promiſes ſucceſs.

The other is ſand, but of a cold ſpungy nature, the furrows all ruſhy, I trenched the furrows only, on which I have ſown the following crops, viz. potatoes, muſtard among ſome of them, ſummer wheat, winter wheat, ſix rowed barley, and a new ſpecies of the cabbage kind, which is by the name I got it by, called Jeruſalem cabbage.

All the crops look extremely well, except in a ſpot here and there, where the red ſand was thrown up very thick, there the winter-cabbage was only weak and puny till the tap-root got through it, and began to feed upon the ſod, or under-ſtratum, which was rotting, then they throve amain.

The Jeruſalem cabbage has a remarkable ſtrong penetrating tap-root. I ſowed the ſeed in the latter end of April, and by the middle of July the plants had got ſuch root in the ground, that it was with difficulty we could draw them. I imagine it will prove the hardieſt and beſt plant for winter feed of any that has been cultivated.

I did think of eating them with cattle, but as perhaps there is very little ſeed to be got in England, and as I think it very valuable, I propoſe keeping moſt of my crop for ſeed.

The plant is of a purple colour, it will not turn to a cabbage, neither has it a ſtalk like any thing of the cabbage or cole-wort kind, for the leaves ſtrike out of the root from the ſurface of the ground.

Where the plants have room the leaves creep on the ground round the root, till they fill a great ſpace, before they riſe.

The tap-root runs perpendicular like that of a parſnip. Upon the whole, I propoſe a great deal from this ſpecies of food for cattle; and it is, without exception, the beſt green I ever eat late in the ſpring.

I ſet my wheat in this trenched ground at twelve inches aſunder, putting three grains into each hole, it fills the ground abundantly, and there are few roots where I cannot count from thirty to fifty ears. The land was graſs when I trenched it, and remarkably full of the red or cut-worm; I was aware of this, therefore ſteeped all my ſeeds in the pickles as directed in this work, by which means I believe I ſaved my crops, as nothing was touched except a little of the wheat.

Before I quit this chapter, I beg leave to inform my reader, that the third volume of this work was printed firſt, and the time it went to the preſs I was not thoroughly convinced by my experiments, but it might be dangerous to turn up ramel, for fear it would ſpoil the land, or produce weeds, but as I am now thoroughly convinced, and have given my reaſons in this chapter, that it may be turned up without danger, I herewith contradict a paragraph in my third vol. chapter iv. page 89, begining at line 20, and the nine lines following, of which I beg my reader will take no notice.

A Table of expence and profit of an acre of trench-ploughed wheat.

	l.	s.	d.
To the rent of land, being graſs and ploughed at Michaelmas	0	16	0
Tythe for the ſaid acre -	0	5	0
Ploughing - -	0	12	0
Seed - - -	0	7	6
Sowing, harrowing and rolling	0	2	6
No weeding, as there was not a ſingle weed to be ſeen			
Reaping and drawing into the barn - - -	0	9	0
Total expence	2	12	0
To 41 buſhels 3 pecks of wheat, at 5s. 3d. per buſhel	10	19	2¼

Clear profit from this acre 8 7 2¼

I leave the ſtraw for threſhing.

CHAP. III.

How to fix the Plough to perform the office of trench-ploughing, and how to perform the buſineſs, &c. &c.

IN my foregoing chapters, I have endeavoured to quote circumſtances, and and to inforce reaſons, in order to prove the utility of this valuable method of trench-ploughing, in this I come to the application of the work.

Though ſeveral learned authors have admitted both of the value and probability of trench-ploughing, yet I do not remember one who has entered heartily upon the cauſe, or has pointed out a method how the farmer could perform the work with any reaſonable degree of expence.

Mr. Randal indeed went ſo far as to invent trenching-ploughs, and advertiſed them at ten pounds a ſet, but this was both too high in price, and too perplexed or complicated in working, for ever to gain a footing among the common farmers, therefore the ſcheme though laudable and praiſe-worthy, fell to the ground almoſt at it's birth.

But notwithſtanding Mr. Randal's ſcheme failing, I do not in the leaſt deſpair of ſeeing this valuable method of trench-ploughing become general among the farmers, particularly as they may perform the work in an eaſy cheap manner by the common plough, with little alterations; for not any thing deters them more from putting any ſcheme in execution then a ſhew of expence.

When we have fixed upon the ground to be trench-ploughed, our next ſtep is to try the depth or ſtaple of the ſoil with a ſpade, and from this we can judge what depth we would have it ploughed, and ſo fix the plough and irons accordingly.

If the land be good and deep, the weeds, and graſs runs deep alſo, conſequently the upper ſtratum, or what compiles the ſod, is thick; in this caſe the firſt plough muſt be geer'd ſo as to run quite under all the roots, by which the next furrow when turned, will be all freſh mold, or what is called maiden earth.

This being turned over the firſt furrow, which now lies at the bottom of the trench, is what the corn is to grow in the enſuing year, therefore muſt be a proper depth or thickneſs for that purpoſe.

If the land have a tolerable good bottom, you cannot go too deep, but if it be a very tough, hungry clay, or a poor red or white ſand, in either of theſe caſes, it may be prudent not to go ſo deep the firſt year, as it will not only, if clay be worſe to work, or break into ſmall particles, but whether clay or ſand, it may be too deep for the roots of the plants to penetrate through in order to feed in the under-ſtratum, and which they will ſtand need of in ſuch poor ſoil.

Therefore, I ſay, in ſuch land only, go a moderate depth the firſt, and add a little more the next trenching, for an enſuing crop.

Any common plough without altering, will turn the firſt furrow, and all that is wanted in the next, is only to add to the mould board a caſt-off board, in order to raiſe the ſecond furrow over the firſt, and which is fixed after this manner, viz.

The firſt thing you are to obſerve, is to have the wing of your ſhare ſo broad as will cut your furrow clear the breadth you intend it; ſuppoſe it be ten inches broad, the ſhare muſt be alſo ten inches, meaſuring from the point of the wing to the land-ſide, in this caſe the wing will be about five inches, you muſt have a thin plate of iron, about two inches and a half broad, welled acroſs the upper ſide of the wing of the ſocket, ſtretching from the breaſt of the plough to the point of the wing.

About half an inch of one edge only is to be welled, the remaining two inches is to remain open, in the nature of a flat ſocket, to admit a thin end of the turn-off board therein.

The turn-off board muſt be about four inches broad, and ſo long as will reach from the wing of the ſocket to the brich of the plough, it muſt be about two inches thick, and muſt have a bracken at the under ſide, in the nature of a foot of a fender, which bracken muſt bear upon the mold board of the plough, in order to ſtrengthen the caſt-off board, that it may bear the weight of the ſod when it riſes.

There muſt run horizontally through

this board, a ſmall iron bolt, one end muſt be crooked like a T, this is to go into a long nick, made in the breaſt plate of the plough, when in, it muſt turn half round, that it may hold faſt therein, by which means it will bind faſt the turn-off board, to the mold board.

Without any other help than this bolt, the bracken under, and one end being made thin to go into the ſocket, that is, in the wing of the ſhare it will be ſufficiently ſtrong.

As many inches thick as you have turned the firſt ſod, ſo many inches the hind part of this board muſt be raiſed from the ſole of the plough, meaſuring at the brich, ſo that the ſod (as ſoon as it parts from the wing of the ſhare) riſes gradually till it comes to the brich of the plough, then it turns it fairly off, and it falls upon the firſt furrow.

By fixing this board properly, one plough may be made to perform the work two or three furrows deep. As the board is moveable it can be carried in the tail of the plough, the firſt furrow round, and when you came at the end, in the time the horſes are turning, it can be fixed.

I am at this time trench-ploughing in ſtrong clay land, with one plough only, drawn by two horſes on a breaſt, one man to drive and hold, and has this moveable caſt off board, to fix for the ſecond furrow; he can plough about half an acre on a day.

There muſt be a cock at the beam end about ten inches broad, to take the plough off the land in the ſecond furrow by ſhifting the hook to the near ſide.

This is all the addition or alteration that is wanted, for performing this great and valuable piece of work of trench-ploughing ;.it is ſo ſimple and eaſy, that I doubt not but any common ploughman may fix it, and the whole expence cannot be above ſix-pence.

The ſimpler and eaſier any machine is made and the more valuable, provided it anſwer the end ſo as to perform the buſineſs it is deſigned for.

CHAP. IV.

Shewing the proper ſeaſons for trench-ploughing, together with a few philoſophical reaſons relating to the ſalts in the air.

AS I have been very explicate in the foregoing chapters, in ſhewing the utility of trench-ploughing, and where it operates or takes effect for the good of the crop, here only now remains to point out proper ſeaſons for performing the buſineſs in, with two or three philoſophical remarks thereon.

The farmers common notion of ſummer fallows are, that what good they receive, is, by being in a ſtate of reſt for one year, and by turning up the roots of graſs, weeds, or ſuch like obnoxious plants to the ſun, in order to be killed by the heat, when expoſed thereto.

They have no notion of the atmoſphere diſcharging the oils, ſalts, or manures it contains upon their furrows, ſuch thoughts may be too ſublime for their underſtanding.

I do not deny but their intellects may be as ſtrong as thoſe of other men, but I refer to any ſenſible reader, if their ideas in general are not more confined than any ſet of men in the world, which is very ſurprizing, when we conſider that their daily buſineſs lies more among the works of nature, than that of any other ſet of men whatever; therefore the exerciſe of which muſt afford more matter for philoſophy or contemplation, which brightens the mind, and opens the ideas to a refined underſtanding.

I can account for a farmer's want of penetration into the works of nature in no better a manner, than a familiarity of his being always among them, by which his wonder ceaſes, his curioſity is ſatisfied, and his enquiry at an end.

The returning ſeaſons puts him in mind to ſow, and ſo does the crop when ripe to reap, his eyes convinces him of the beginning and ending thereof, and therewith he is ſatisfied, without penetrating farther into the wonderful cauſe thereof.

Experience tells him, that a great quantity of dung forces him a good crop of corn, and is not wanting alſo to raiſe him a plentiful one of weeds.

This he ſees, but ſince labour and expence will eradicate them, he troubles his head no farther about it; when his land is tired of corn and overſtocked with weeds, his next ingenuity is to reſt it, and kill his weeds by a ſummer-fallow.

This courſe of husbandry chiefly takes in all his curioſity or enquiry into the works of nature. In ſhort the ſtupidity in ſome of them is ſo extremely great, that one would think one piece of miſmanagement which they are guilty of, could not eſcape the greateſt novice's underſtanding.

And that is, in letting their dunghills be over-grown with weeds; how often do we ſee dunghills covered with nettles, thiſtles, docks, &c. perhaps to the height of a man, their roots and ſeeds permitted to intermix thereamong, and then ſpread upon the land to grow, and cauſe pounds of expence, to deſtroy what might have been prevented for a few pence.

Such courſe of husbandry has gone on from generation to generation, without amendment by them; for any improvement we are fallen into of late years, is chiefly owing to gentlemen who farm their own eſtates, or to ſhop-keepers, publicans, &c. who live in great towns, and take farms for either their amuſement or profit.

If we look through the whole kingdom, we ſhall find ſuch occupiers of land to have better crops than farmers who have been at it all their lives, and it is to ſuch gentlemen that we are indebted moſtly for any late improvement in agriculture, though they are generally taunted and laughed at by the country farmers.

Many a time have I heard them curſe ſuch like gentlemen farmers, and wiſh their crops might fail, for troubling themſelves with what did not belong to them.

I know it is only a few of ſuch bigoted old faſhioned farmers that will read this book, ſome are too covetous to buy it, and the reſt are either too proud or conceited in their own opinions, either to read or follow any inſtructions therein.

No, they would ſcorn to be book-farmers! What, ſay they, ſhall a gentleman, becauſe he can write, pretend to inſtruct me what to do with my land? does he know better than myſelf, who has been brought up to farming buſineſs all my life time, and perhaps on the ſame land too? a pretty joke indeed.

However, Mr. John Oldroad, ſhould your landlord, or any other Mr. Newinvention, chance to put this book into your hands, I would have you to retire into ſome corner to read it, for fear any one ſhould ſee you bluſh, when you look at your own picture, drawn ſo nearly to life; and ſhould I be ſo fortunate as to open your ideas, ſo as to make you purſue any new plan, which will turn out for your own profit, be aſſured that I have my full reward and gratification therein; but to return.

I promiſed in this chapter to ſhew the proper ſeaſon for trench-ploughing, in which the following reaſons will prove to be at or before Michaelmas.

First, becauſe by that time we reap the profit of the preſent year. If ſtubble land be the object for trench-ploughing, let it be done as ſoon as the corn is got off, in order to bury the ſtubble, graſs, or weeds, whilſt they retain their juicy particles, which will add much towards rotting, fermenting, and enriching the earth; and ſince this method of burying them, anſwers a better purpoſe than the ſummer fallow for killing them, we have no occaſion to loſe a year's profit and much labour in ploughing on that account.

Secondly, we may ſow any crop we pleaſe, ſuppoſe wheat after wheat it matters not, ſince what mold produced the laſt crop is buried, and turned up in it's place a freſh maiden earth, that muſt be the chief ſupport of the preſent trenched crop.

Thirdly, if the under-ſtratum be turned

up in the latter end of the year, it will be ſubdued, brought to temperance, and enriched by the winter's ſnow, froſt, and atmoſphere, which let the farmers think what they will to the contrary, contributes more towards enriching their land than the ſummer's fallow; and would they come rightly into this way of thinking, they would not let their land lie in a cloſe dormant ſtate all winter, but plough it and leave it open, in order to receive theſe benefits; but it may not be amiſs in this place to give a few philoſophical reaſons, how the air becomes impregnated with ſalts, and how they aſcend and deſcend to enrich the earth, &c.

As no proof is ſo convincing as occular demonſtration, I ſhall refer my reader to a ſimple experiment, which he may try by an onion, viz.

In the middle of winter, when onions are in their moſt dry and light ſtate, weigh one very exactly, then tie a thread round it, and hang it up at the top of a room, where no part thereof can touch the wood or any other matter.

As ſoon as ſpring puts in, it will begin to grow or vegetate into a long top, when it is in its moſt vigorous and juicy ſtate, before it begins to weather, weigh it again, and you ſhall find it's weight augmented ſurprizingly, perhaps one third.

Now it is quite clear to the weakeſt underſtanding, that what it increaſed in weight was collected from the atmoſphere, as it had no connection with any other matter that could afford this addition.

Now ſince it is obvious that the atmoſphere or air is impregnated with oils, ſalts, or ſulphurs, which act as manure or food to the vegetable creation, my next problem is, how it came there, and this we can trace from various cauſes.

But nothing is better known and more clear to every farmer, than that ſoot is a good manure, and alſo that it is a collect-

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ed matter from various bodies, ſuch as coals, ſticks, ſtraw, turf, earth, water, candles, oil for lamps, ſteam of boiling pots, &c. all theſe, or as many as are burned in a room, evaporate and ariſe up the chimney, which is purpoſely contrived as a paſſage for the air, and which attracts all evaporated matter thereamong; but though we find great quantities of thoſe matters cling or ſtick to the ſides of the chimney as ſoot, yet both our eyes and reaſon tells us, that much greater quantities eſcape and riſe into the firmament.

Beſides all theſe bodies uſually conſumed in houſes, which are very great, there are alſo other ſorts which ariſes from natural cauſes, ſuch as the ſteam and ſmoke of dunghills, hay-ſtacks, or any ſuch matter, when in the ſtate of fermentation; likewiſe the burning lime, brick, and burnbeating; in ſhort, all the animal creation aſſiſt in ſending manures into the clouds, both by evacuation and ſteam from their noſtrils, &c.

It is true, ſome things produce more ſalts, and richer vapours than others; as for inſtance, ſuppoſe we lie together two or three hundred weight of coals, and throw thereamong five or ſix gallons of water, ſet the coals on fire, and they, together with the water, ſhall all aſcend in ſmoak, except a few pounds only of aſhes.

At the ſame time, if you burn in the ſame room ever ſo many candles, they ſhall all evaporate imperceptibly, mix with the ſmoak, from the aforeſaid coals and water, and all unite and join in the natural cauſe of compoſing three of the elements, namely, air, water, and earth.

All this is plain to the eyes and reaſon of any man, but how theſe bodies ſhould be divided or ſeperated, and again deſcend as manure, &c. is another queſtion, and perhaps not within the comprehenſion of every one.

From all the foregoing remarks and obſervations, we ſee the immenſe bodies of matter that evaporate and ariſe into the sky; all the clouds we ſee floating about in the firmament are compoſed of earth, water, and air, ſometimes the fourth element, fire, intrudes therein, which cauſes a convulſion, from which proceeds thunder and lightning, as fire and water cannot agree together.

The water is exhaled, drawn up, or attracted, by the heat of the ſun; at different periods, the earth is divided into very fine ſmall particles, and mixed therewith, ſo that theſe two bodies, being incorporated together, are born up in ſmoak by the air, and exhaled by the ſun, ſo keep aſcending till they come at a pure, fine, thin ſerene air.

Being arrived in this region or latitude, the heat of the ſun, together with the thinneſs of the air, rarifies and divides the ſalts, oils, and earth from the water, for the air in this region is ſo thin and fine that is impoſſible for any groſs matter to remain therein, without undergoing a rarifaction, that cauſes a ſeparation of particles.

The two bodies or elements of water and earth, being thus divided, deſcends again to our earth, one in clear rain water, and the other imperceptibly in ſnow, miſts, fogs, or duſt, &c.

Every farmer will admit that ſnow is a great inricher of land, which may be accounted for in this manner, viz.

When large bodies of water and earth aſcend into the upper regions, and when in the act of rarifaction there comes a cold eaſterly wind, which cauſes a great emotion, agitation, or tumultuous friction in the firmament, by which the waters are toſſed, tumbled, and chafed to ſuch a degree, that they are raiſed into a white froth, and whilſt in this frothy ſtate, the extream coldneſs of the air congeals and binds the earthy particles up with the water, ſo that both deſcend as ſnow upon the earth, and when melted or diſſolved, the water returns to the drains, but the earth or ſalts remain on the ground, and acts as manure, which we may ſee immediately to take place.

For after every ſnow we may diſcover the earth (particularly ploughed land) very light, open and ſpungy, which is very plain, that ſome oils, ſalts, or ſulphurs, had penetrated therein and cauſed a fermentation, or we ſhould diſcover no more alteration in the mold after ſnow, than after a heavy ſhower of rain, which makes it generally remain ſad and cloſe.

A great deal of theſe enriching qualities alſo deſcend in the time of froſts, which penetrates, works, lightens, and enriches the earth, which upon the froſt going away is eaſily diſcovered.

I have gone through theſe allegations, in order to prove the value of winter fallow, or opening the ground to receive all theſe benefits.

Therefore point out the beginning of October as the beſt time for beginning to trench-plough in.

For as we turn up a dead inactive earth, the ſnow and froſts, as before obſerved, will not only ſubdue and temper it, if hard and ſtubborn, but alſo raiſe it into a lively fermentative action, and cauſe it to become friendly and mellow.

In February laſt I trench-ploughed a piece of ſtubborn clay land, and though it only got a little froſt and ſnow in the ſpring, yet it reduced it more to temperance, and was of more real ſervice to the land, than all the ſummer fallowing.

Theſe, and many other good reaſons, I am clear, that ſet aſide killing the weeds, (and that is provided for in trench-ploughing) a winter is far preferable to a ſummer fallow, for in ſummer the ſky is high, thin, and clear, and the heat of the ſun acts more ſtrongly in exhaling the ſalts, oils, and other vapouriſh particles of the earth, which float about in the liquid air, and is undergoing the ſtate of rarifaction a great part of the ſummer, but by the preſſure of the atmoſphere, being then overloaded with ſuch bodies, it deſcends in winter in the various manners aforeſaid.

All the aforeſaid reaſons prove beyond a contradiction, both the large quantity of manures the air contains, and alſo how it aſcends and deſcends to enrich the corn-mold; but however, notwithſtanding all this, the under-ſtratum of ſome grounds will be ſo barren, that a top-dreſſing of ſome fine manure, ſuch as lime, aſhes, pigeon-dung, malt-duſt, or a compound of manures, may be adviſeable to throw on with the firſt crop.

But if the farmer's ſituation be ſuch, that he cannot provide himſelf with any ſuch manure, his next forecaſt muſt be to ſow ſuch crops as will do beſt without manure, and at the ſame time ſhould they miſs, he may have no great loſs therein, as for inſtance:

Should the land be ever ſo poor, and whether clay or ſand, if it be trench-ploughed in autumn, it will grow fitches for a winter crop, and be the earth ever ſo dead or inactive aforetime, if any one thing begin to grow therein, it naturally brings on a lively fermentation, and when the crop is off, the roots become a manure: vetches is an excellent crop for ſuch trenched land, for ſeveral reaſons, particularly if eat on the ground with ſheep or ſmall cattle.

Firſt, becauſe the expence of the ſeed is but a trifle.

Secondly, what fodder it produces is in a manner clear gains, as they do not take the year's rent upon them, being ſown after the crops are reaped, and may be eat off the ground time enough to ſow ſpring-corn thereon.

Thirdly, by the trampling, urine, and dung of the cattle, the time they are eating the fitches on the ground, the land will be much improved thereby, ſo that it will be in condition for any crop the enſuing year.

A farmer ſeeing all theſe advantages, and comparing them with his own ſituation, and ſtate or ſtaple of his ground, may apply ſuch dreſſings, or ſow ſuch crops, as in all appearance, will afford him the moſt profit, and alſo bring his land into the beſt condition for the future, with the leaſt expence.

If the land be trench-ploughed in the latter end of the year, and not ſown with any crop till ſpring, it may not be amiſs to give it a thin ploughing juſt before ſowing with great care, though not to touch or turn up any part of the under ſod.

Then ſow the ſeed you intend, and harrow it in, which having no ſod to tear in pieces, it will be eaſily wrought, and fear not but you will reap more profit from this method of trench-ploughing than from any other whatever.

And I doubt not but it will in time become a general practice, which I ſincerely wiſh, as my ideas are clearly open, and at one view, ſee the great utility that it will be of to the public in general, as well as to the farmer himſelf.

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CHAP. V.

Explaining the author's new-invented moving Sheep-houſes, &c.

I Have often lamented the miſerable condition I have ſeen both ſheep and cattle in, when eating turnips on the ground, in a wet ſeaſon, particularly if the land was inclined to clay, or of ſuch a nature as to hold water.

How extremely diſagreeable muſt it be for the poor dumb animals to ſtand or lie in dirt, perhaps ſhoe-top deep, which is too often the caſe.

It is impoſſible cattle in ſuch a ſituation can thrive, or feed ſo well, as were they to lie dry, clean, and warm, neither can they eat the turnips with that freedom and appetite, when they are rolling or tumbling about in the dirt, as they would out of a clean rack or manger, not to ſpeak of the loſs and waſte in turnips when in ſuch a dirty condition.

This I believe will be aſſented to by every reaſonable man, and this alone was enough to retard the culture of this valuable crop from ſpreading or becoming ſo general as one could wiſh.

Every one ſees the neceſſity of ſome contrivance to remedy theſe evils, but no one ever yet ſtruck out a plauſible plan; ſome farmers indeed would carry the turnip crop off and eat it upon graſs ground, but this is attended with great labour and expence, beſides cutting and ſpoiling the ground, and as the ſaying is, robbing Peter to pay Paul, as it certainly hurts the turnip ground to carry the crop off.

It was ſuch material conſiderations as theſe, which firſt put me upon the ſtudy if poſſible to find out a remedy for ſuch evils, and I flatter myſelf that I have accompliſhed my deſign, by the invention of a moveable houſe, which not only anſwers all the ends of keeping the cattle dry and clean, and of ſaving the turnips, &c. but is alſo of a ſimple conſtruction and comes cheap to the purchaſer, which are very material conſiderations in any new invention, for the higher the price, and the more complicated any machine is, and the lower is its value or utility to the public.

Theſe are the grand points which every inventor ought to keep in view, for tho' the invention be ever ſo ingenious, if the conſtruction be ſuch, that none or few but the inventor can work it, or ſo high in price, that the purchaſe will overbalance the utilily ariſing therefrom, it cannot be ſaid to be profitable, this is the rock that many new inventions ſplit upon.

I have ſpent much ſtudy in new ſchemes, and I always found more labour in reducing them to a cheap and ſimple conſtruction, than in any other part of the invention.

The ſheep-houſe is ſixteen feet one way, by twelve the other; it is all made of deal, has no floor in it, has a rack and manger, the rack is filled with turnips, &c. at the outſide of the houſe.

The ſtaves that the ſheep eat through, ſtand plum, ſo conſequently the ſlope which gives room for the turnips projects to the out-ſide of the houſe.

Under the rack is a manger fixed, which goes cloſe to the bottom, and only conſiſts of one deal board, ſix inches broad, one thick, and ſixteen feet long, as it goes all the breadth of the houſe; one of the edges is ſloped, or made featheredged, ſo as nail to the bottom of the rack, by this it forms a ſort of triangular trough, going narrow at the bottom.

The rack being filled with turnips, any

that is large ſticks in the top thereof, and as the ſheep eats them they grow ſmaller, ſo conſequently drops lower and lower, till they be ſmall enough to drop through the ſtaves into the manger, which catches every bit, ſo that none need be waſted.

The rack-ſtaves are three feet long, and are fixed into the two rails, one for the top, and the other for the bottom of the rack, in order to ſave a multiplicity of timber. And in order to cut it to the beſt advantage, buy one plank ſixteen feet long by three inches thick and twelve broad.

This will cut into four ſcantlings, each about three inches ſquare; theſe are all that are wanted for the frame of the two ends of the houſe.

It is to be obſerved the houſe is four feet broader than it is long.

Two of theſe ſcantlings are for the fore part of the houſe, and the other two for the hind part.

The rack and manger are fixed in the end of the houſe that goes foremoſt; one of the rails or ſcantlings are tenured into a ſtandard at each end, and which both ſerves for a platform, the bottom of the rack, and a ſide or back part of the manger, becauſe the rack ſtaves go into it.

They are three feet long, and are fixed into the other rail, which is the top of the rack, and alſo tenured at each end three feet high into the ſame ſtandards that the bottom rail is tenured.

The ſcantlings for the ſide of the houſe are three inches ſquare, and twelve feet long; there is only one at each ſide for a platform, and which are tenured into each end of the ſixteen feet rails which go acroſs the houſe.

The houſe is built ſhed-wiſe, the fore

part over the rack end of the houſe is ſix feet, and the hind part is four feet high, therefore the ſhed or fall for water is two feet only.

The poſts or upright ſtandards, which is to ſupport the roof, and to which the boards are nailed round the ſides of the houſe, are only two inches ſquare.

There are five tenured into the platform, or ſixteen feet ſcantling at the hind part of the houſe, one at each corner, and three at equal diſtances between.

The two corner uprights, into which the two long ſcantlings for the rack and manger are tenuted, are ſix feet high.

Between theſe are three more, of three feet long, each tenured at equal diſtances, into the topmoſt rail of the rack.

Theſe ten ſtandards, being five before and five behind, are oppoſite each other, and they muſt ſupport the roof of the houſe.

Five ſpars are joined by mortice and tenure to the top of ſaid ſtandards, each ſpar is twelve feet long, to go the length of the houſe, and on which the covering boards are nailed.

At each ſide of the houſe are three ſtandards to nail the ſide boards on, ſo that the whole number of ſtandards round the houſe are ſixteen, the number of ſcantlings or rails ſix, and the number of ſpars five, which being all joined together as above, form the skeleton of the houſe, and what remains is to incloſe it with thin boards at three to an inch.

That is, an inch deal board muſt be ſlit into three, which is thick enough either for covering or ſides, as the thinner they are and the longer they will keep from rotting, becauſe the wind acts in a double capacity of drying from both ſides.

The top of the houſe muſt be painted with tar and brown oker mixed, in order to preſerve the wood, and ſhoot off the water.

The covering boards muſt only be nailed in the upper edge in the nature of a ſlate; this will give them liberty to dry in or expand themſelves when wet or dry, without cracking or opening with the ſun or wind, whereas, if they were nailed with more nails than one in the breadth of the board, the nails would not give way or yield to the change of weather, therefore there muſt inevitably be an opening between each nail.

In order to prevent the boards from riſing, or blowing off with the wind, you muſt cut a twelve feet inch deal into five rods, almoſt like tiling laths; you muſt ſtretch one of theſe acroſs the boards, oppoſite to each ſpar, and thereto nail them with twelve-penny nails, obſerving only to put one nail into each board at the upper edge, alſo cloſe by the firſt nail that faſtens the board on.

Theſe laths keep the boards firm and cloſe, and at the ſame time gives them liberty to play and expand themſelves backwards and forwards, and yield to the weather as it requires, by which means the boards will never crack or open.

The boards muſt lap over about two inches at leaſt, particularly if they be green when put on, as they will run in ſurpriſingly in a hot day.

The houſe muſt be ſo contrived as to take into eight parts, none of the nails muſt be drawn, or the boards taken off ſeparately, but the tenure and mortice at each corner muſt be made to draw, by which the two ſhort ſides are two pieces, the rack and manger are another; the other long ſide where the door is, is another, and the door is taken off, as it is only hung by two ſmall cords at the upper ſides, ſo falls cloſe at the inſide of the houſe.

The covering of the houſe is taken into four pieces.

The houſe runs upon four caſtors, like thoſe of a bed.

Two of the caſtors are fixed under the frame at the two hind corners, and the other two are fixed about nine feet diſtant from them under each of the ſides towards the rack.

When it is filled with turnips, it brings down that end to the ground, ſo that by once trying what wheight of turnips it takes to bring down the ſaid end, for the future you only have to fill the rack till the end comes down, and by a piece of chalk, ſet each rack full down on the houſe ſide, by this you can eaſily tell what wheight the ſheep eats from a day to a month, and ſo ſoon.

Likewiſe what wheight each acre will produce.

A little trouble and conſideration will ſhew you at what diſtance from the rack to fix the balancing caſtors, as they are to act in the nature of a center in a ſcale beam, and the longeſt end of the houſe from theſe caſtors is to be equivalent to the weight of turnips put into the rack.

It is neceſſary to have the ſaid two caſtors that act as a center for the balance a little higher than the two hindmoſt caſtors, in order to make the forepart of the houſe cock up about ſix inches from the ground.

The houſe always ſtands upon two deal boards, and having two moveable deals, in order to lay before or at the end of theſe two, you draw the houſe forward upon them, ſo by bringing the hindmoſt forward, you may eaſily move the houſes any where, for by going behind to puſh it on, the ſheep will naturally fly from you, therefore be no hindrance; and as the caſtors always run upon the boards, they are ſo light a draught that a boy may move them with eaſe.

By having the moveable boards ſixteen feet and a half long, every time they are ſhifted, you meaſure a ſquare perch of ground, and as are there an hundred and ſixty perch in an acre, and as each houſe will hold twenty ſheep, you may bring yourſelf to a regular mathematical rule, to know how much wheight of turnips each perch produces, and how long they will ſerve ſuch a number of ſheep.

And all is done without any more trouble than making a chalk every time you move the houſe, and another chalk every time you fill the rack.

The rack end of the houſe always goes foremoſt towards the ſtanding turnips.

You pull the turnips as far as you can

reach, and fill the rack, then puſh forward the houſe to a freſh piece; as you pull up the turnips with one hand, you muſt in the other have a whiſp of ſtiff wheat ſtraw, cut in the nature of a bruſh, to take off any dirt that may be at the under ſide of the turnip, this is almoſt as eaſy done as let alone, as it keeps the manger clear from dirt.

The labour of taking the turnips by the top, and throwing them into the rack, (having it always beſide you) is no more than the preſent cuſtom of hacking up the ſhells.

It is to be obſerved, that ſheep are not the better for being kept over cloſe, therefore have a place, to open at the ſhelter ſide of the houſe to let in air.

The fore part of the houſe, between the top of the rack and the roof, muſt be incloſed by a hanging door with cords inſtead of hinges, it muſt fall againſt the upper part of the rack.

In fine weather it may be taken off or turned up occaſionally.

In the hind part of the houſe, there is alſo a ſpace of one foot between the upper rail and the roof, which muſt be left open, except a ſtorm come in that quarter, then it may be incloſed with a deal board hung with a cord inſtead of hinges.

You need not be over nice in joining or lapping the boards over, when nailed on the ſide of the houſe, it is not the worſe if there be crevifes to let in air or light.

There muſt be a deal board over the top of the rack, by the way of a lid, to keep out ſnow, &c. Each houſe will hold twenty ſheep, and give room enough to feed and walk about.

The above is as conciſe a deſcription as I can give to make a ſheep-houſe, and there is nothing differs from that of a ſtable or ox-houſe, except the height thereof, and the ſize of the timber.

The width and breadth of either ſtable or ox-houſe muſt be the ſame as the ſheep-houſe, viz. ſixteen feet by twelve feet, which is ſufficient for three horſes or four oxen.

The fore part of the houſe where the rack is, muſt be eight feet, and the hind part ſix feet high, this gives a ſhed of two feet.

The boards round the ſides muſt be half an inch thick, but thoſe that cover the houſe only three to an inch, the ſame as for the ſheep-houſe.

The boards round the ſides muſt be nailed at the inſide of the ſtandards, which will prevent the nails from drawing when cattle rubs againſt them.

The ſcantlings which compoſe the frame of the houſe muſt be three inches thick, by four deep.

The bottom of the rack muſt ſtand two feet from the ground, therefore three ſcantlings muſt go acroſs the houſe, viz. one at the bottom for a ſole, and one at the bottom, and another at the top of the rack.

All the ſtandards being ſixteen, which go round the houſe, to nail the ſide-boards to, and to ſupport the roof, muſt be three inches ſquare, but the ſpars only two inches ſquare, the ſame as thoſe for the ſheep-houſe, as they have no more weight to bear.

The door muſt be hung with hinges.

Theſe houſes being heavier than the ſheep-houſes, the caſtors that ſupport them muſt be ſtronger in proportion.

The manger will take two boards, each ſixteen feet long, by one inch thick and ten inches broad.

A ridge-board ſixteen feet long, ten inches broad, and one thick, muſt go acroſs the middle of the houſe, and ſupport the middle of the ſpars; in order to ſtrengthen them, it muſt ſtand edgewiſe, and be notched into the middle ſtandard at each end.

The houſe running upon light principles may be moved by one man.

A Table ſhewing the expence of a ſheep-houſe, as it ſtands in my book of experiments, and as fir timber now rates in York, being from 11*d.* to 13*d.* a ſolid foot, and ſo in proportion for deal boards.

When timber is cut into thin deal boards, for covering and incloſing theſe houſes, it is neceſſary to uſe a thin frame ſaw for the purpoſe, in order to ſave timber.

To twelve boards, each twelve feet long, by one inch thick, at 15 *d.* per board -	0	15	0
To ſawing two cuts in each, at 2 *d.* a cut - -	0	2	0
To three planks, ſixteen feet long each, by three inches thick - -	0	13	6
To ſawing three flat cuts in one of ſaid planks for rails	0	0	3
To ſawing two deep cuts in the other two, taking an inch board off from each, which will make the ridge-board, manger, and a lid for the rack, the two cuts -	0	0	6
To ſawing flat cuts in the remaining two inch boards, in order to reduce them two inches ſquare for ſtandards and ſpars, &c. -	0	0	8
To timber and ſawing for rack-ſtaves - -	0	3	3
To four bed caſtors -	0	1	8
	1	16	10

Brought over	1	16	10
To a man three days to build the houſe	0	6	0
To two hundred of fourpenny nails	0	0	6
To one hundred of twelvepenny nails	0	0	10
To pitch, tar, and brown paper, as covering for the houſes	0	6	0
To boards for the houſe to run upon	0	2	9
	2	12	11

Theſe houſes are much cheaper than common ſheep-pens, conſidering how long they will laſt, and what yet adds to their value is, that one may proportion the houſes, to the number of ſheep; ſuppoſe you have twenty ſheep you only need one houſe, whereas, if you have only twenty ſheep in the common method, you muſt have as many pens or bars as would do for a hundred.

The expence of a ſtable for three horſes or four oxen, will only come to between four and five guineas in any part of England where timber is the deareſt.

CHAP. VI.

Shewing the great utility of the moving houſes, were they brought into general uſe, for all ſorts of cattle.

WAS my reader well to conſider the immenſe quanties of manure he loſes by the preſent method of houſing the cattle, he would let nothing prevent him from making uſe of moving-houſes.

It is liquid manure, I mean the urine of cattle, which none of the Engliſh farmers pay any regard to.

In Germany the farmers make more uſe of liquid than any other manure, which experience and their crops tells them that they are right.

They do not loſe the leaſt urine from any cattle while they are in the houſe.

They alſo convert little-houſe dung into liquid manure, and bring it in casks many miles; they buy it by the gallon at a very high price, and puts it together in a pit or reſervoir, and keep it ready for uſe, and eſteem it the better for age; they alſo take care to have cloſe covers to theſe liquid pits, to prevent the ſun from exhaling the ſpirits therefrom.

Reaſon proves beyond a contradiction they are right in all this, and if ſo, our Engliſh farmers would do well to copy of them, and to pay due regard to ſuch manure.

Moſt ſorts of cattle, ſuch as horſes,

hogs, cows, or ſheep, evacuate much more weight by urine than by dung, and the ſame weight of urine will produce much the greateſt quantity of ſalts, which are what muſt feed the crops.

When turnips are eat on the ground with ſheep in the moving houſes, the land gets all an equal dreſſing, as the ſheep are confined juſt as long on each part as they are in conſuming the crop that grew thereon.

But when at liberty, they upon every cold blaſt or ſhower of rain run together under a hedge, or any little ſhelter they can find, and remain there till they over manure it, though other parts may want.

Perhaps ſome of my readers may not conſider the thing right, and may imagine that twenty ſheep being confined on one perch of ground, may tread it to dirt.

But this is not the caſe, becauſe they are no longer confined than whilſt they eat the turnips that grew thereon, and this they muſt do, be they confined in what other fencing you pleaſe, only with this difference, that they will make more feetings by running backwards and forwards to take a bite out of each turnip, than they would do by eating them out of a clean rack and manger.

But what makes dirt in the common way of eating them is, when a freſh break being opened, the ſheep immediately traverſe it all over, and trample it full of holes, which the firſt ſhower of rain fills with water; therefore when the ſheep goes again over it, the ground is made immediately into mortar, ſo conſequently the ſheep are retarded from feeding, and and a great part of the turnips waſted, by being trod and tumbled about in the dirt.

But in the houſes this is all prevented, as not the leaſt rain falls upon the ground after the ſheep comes on it till they leave it again.

And the ground being whole or untrod when they come upon it, they cannot tread it to dirt, for the more they tread and the dryer and firmer it will be.

They only lie one night on the ſame ground, neither do they ſtand half ſo thick on the ground as they do in the common method of folding.

The turnips being pulled and thrown into the rack, the ſheep eats them while they are green, freſh, and retain all their juices, but in the common method, ſuppoſe the ground be dry and ſandy, yet the ſhells become dry, and loſe a great deal of their ſubſtance.

Any farmer who contrives to make the beſt of his crop, will eat the turnip tops with lean ſheep, either ewes or hogrils, becauſe they are not of ſo feeding a quality as the bottoms, being full of a ſharp acid quality, which ſcowers fat ſheep, and retards their feeding.

Some farmers in Lincolnſhire buy old ewes, and draw out their fore-teeth, and turn them among their turnips to eat the tops without ever touching the bottoms.

This method, though a barbarous one, ſhews an œconomy, and leaves profit too, if properly judged.

But ſuppoſe the ſtock be too large for the tops to feed them, there may be a loſs attending it, as they can eat nothing elſe to finiſh the fattening.

But all this is provided againſt in the houſes, becauſe every ſecond or third houſe may be allotted for lean ſheep, and the tops cut off and given to them.

This may be done with little trouble, by having a ſcyth point, or the like, faſ-

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tened in the corner of every houſe, and a basket placed under it for the tops to drop in when cut off; and as the houſes are all of a row, and cloſe together, they have only a few ſtrides to carry the tops and throw them into the rack to the lean ſheep.

A few turnips may be given now and then to the lean ſheep for change of diet.

The ſame œconomy may be uſed in regard to horned cattle fed with turnips, for the tops may be given to cows, calves, or any ſort of lean cattle, and the bottoms to fat cattle, with the like ſucceſs as in ſheep.

If horned cattle be put into theſe houſes, they muſt be tied to the bottom of the rack by a halter that goes round their horns; and either ſheep or cattle that are fed in theſe, when put in, muſt not be let out again ſo long as they are at turnips, neither muſt they have any water, the juice of turnips provides abundantly in this way.

Any cattle or ſheep that are fed upon turnips ſhould have a little hay put into the rack every day, in order to clean their mouths, and give them a freſh appetite for turnips.

It might be very proper for any perſon who has cattle feeding upon turnips, to provide himſelf with a hay-houſe, made upon the ſame plan, only inſtead of being ſixteen feet by twelve, he need only have it twelve feet ſquare, and no rack and manger; the ſaving of theſe will do more than pay for ſix ſcantlings or bearers for the hay to lie upon.

Three twelve feet deal boards, one inch thick each, ſplit in two by a flat cut, and each ſcantling ſet up edgewiſe, ſtretching from one ſide of the houſe to another, will be ſtrength ſufficient to bear a load of hay, and which is enough to put into the houſe at a time.

We ſee the many and great advantages that attend theſe houſes in point of turnips, but their utility does not end here, it extends alſo to graſs ground.

They are very uſeful for field ſtables, it being much better to have a moveable ſtable that can be ſhifted at pleaſure to a clean and poor part of the field, then as is uſual to have them ſtand always in a place, whereto the cattle reſort, and not only break the ſurface and tread the ground to mortar, but with their urine enriches it more than needs, whilſt other parts want it.

Dung, indeed may be gathered up and ſpread elſewhere, but urine when waſtfully dropped cannot be recovered.

I hope to ſee the time in England that due regard will be paid to the liquid manure, and that fermers will have no other but moving cow-houſes and ſtables, to expend all their winter fodder in.

Was this the caſe, they might manure double the quantity of ground with the ſame number of cattle, and alſo keep more cattle with the ſame quantity of fodder too, as none will be waſted, neither need they any litter or bedding, for being moved twice a day, viz. every night and morning on a clean freſh piece of graſs, they would lie very clean and dry.

What a great piece of graſs ground might a farmer manure in a winter, with ten or a dozen of theſe houſes going on a breaſt up a field.

But was this ever to be the caſe, care muſt be taken not to ſpread the dung on the places where the cattle ſtalled, as that would be rich enough without it.

Each houſe would manure well, without any other aſſiſtance than what went through the body of the cattle, two acres in the winter half year.

Such houſes as are made for winter uſe, may be converted into hog-houſes in ſummer, and which are very valuable to any one who keeps hogs to feed on clover, or any other ſour graſs, becauſe the hogs can be confined on a place till they eat it bare, and then ſhifted on to freſh.

By the clover not being trode or tumbled on it will go the farther, and tho' the hogs are ſafely confined, (being a miſchievous creature) yet they will thrive well.

Beſides no one who has cattle in ſummer paſtures, that has not many rank places therein, which produces long ſour graſs, that the cattle will not eat, and which is the moſt proper for hogs; therefore if a parcel of hogs be put into one of theſe houſes, and the houſe run over ſuch places, by which means you convert what before was of no uſe into real profit.

So that in ſhort, tho' theſe houſes are

cheap and ſimple, yet their utility may be immenſe, if brought into general practice.

As carrots and cabbage are excellent winter feeding, and are likely to gain footing in the world, by ingenious and ſpirited cultivators, theſe houſes may alſo be of infinite ſervice in feeding cattle on the ground therewith, as in the caſe of turnips.

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CHAP. VII.

On the management of turnips, and their perfection.

TURNIPS are a crop that deſerves the husbandman's attention, perhaps as much if not more then any one he can cultivate, particularly for winter feeding for cattle, as may appear by a table hereunto annexed.

Their general uſe as food for cattle is not of very old ſtanding in England, tho' more ſo than cabbage or carrots, but in fact every vegetable of the ſort has made a quick advance within the ſpace of a few years.

If we look back we ſhall find that not longer then two centuries ago, we had no greens or roots for the table, but what was imported from the Netherlands.

The people in thoſe days imagined the climate of England would not produce garden ſtuff, but were they to ariſe again and take a view now, they would be ſurpriſed with the progreſs we have made therein, as perhaps we may now go near to rival the world in that point, tho' yet far ſhort of being at the height of improvement in it, as new diſcoveries are making every day.

The county of Norfolk is more forward in turnip husbandry than any other part of England, it is their capital piece of farming, in which they take great pains, and certainly do excel.

Their land is very proper for the crop, being chiefly inclined to ſand, therefore the cattle are not abuſed, and the turnips waſted in dirt, by feeding off, which is one of the firſt conſiderations belonging to a turnip crop.

I have ſeen both clay and loom produce heavier crops of turnips than I ever ſaw in Norfolk, and with leſs labour too, but then the queſtion was, how to eat them off? this is the rock they ſplit upon, as one half perhaps was waſted in the dirt, neither do the cattle thrive ſo well, or feed ſo faſt in ſuch a diſagreeable dirty ſituation, it is that which deters farmers from entering heartily into the ſpirit of the crop, and not ſo much the want of knowledge how to raiſe it.

That being ſimple and eaſy, as they are far from being a tender plant.

But I hope the moving houſes will put an end to theſe difficulties, and that farmers will cultivate this valuable crop on every ſort of land, and every part of the kingdom too, as there are none but what will produce them if properly managed.

In 1748 I raiſed in Ireland upon ſtrong clay land, thirty acres of turnips, that upon an average weighed thirty nine tons per acre, but ſome of the beſt part of the field was weighed, and proved to produce fifty-three tons per acre.

But the land was ſo clayey and wet, that no cattle could go on it to eat them, ſo was obliged to carry them all off in hampers on horſe-back, which made it very expenſive and troubleſome, not being then acquainted with the moving ſheep-houſe.

The Norfolk farmers raiſe all their turnips after fallow, they give three, four, and ſometimes five ploughings.

They generally dung for turnips, therefore by the fallow, well dunging, and two or three hand-hoeings, they may well expect a good crop, yet they often loſe them by the flie, and ſometimes have their land to ſow two or three times over.

The beſt farmers will begin to hoe when the turnips are very young, perperhaps not above an inch high.

In this they are certainly right, becauſe if they be ſuffered to grow thick at firſt, they draw one another up tall and weak, in which caſe they get a bad turn in appling, but if thinned early, the tops ſpread along the ground, and they apple more kindly.

For their firſt hoeing their general price is three ſhillings per acre, and the ſecond two ſhillings per acre.

When they ſell a crop, their medium price is about forty-five ſhillings per acre, which is only low, but this is chiefly owing to plenty, as every one are in the branch.

Their weight of turnips per acre, from thirty to forty tons.

The crops vary leſs in quality than in any other part of the kingdom, owing chiefly to their regular courſe of husbandry, as every one follows it without varying.

After turnips they ſow barley, and ſeldom fail of a good crop, which runs from four to five quarters per acre.

After barley, clover and rye-graſs, or by them called white none-ſuch, but this is the rock they ſplit upon, and which they all feel and complain of, but cannot find a remedy, as they do not comprehend from whence the evil ariſes; and ſince I am on the ſubject, I beg leave to enlarge a little thereon.

The general complaint among all the farmers through Norfolk is, that their land is tired of clover, that is, their clover crops are not ſo good as they formerly were, that it wears out, grows thin, and even all dies away in places.

This complaint is not more general than true, which my eyes can witneſs, for I have viewed clover moſtly all over the county, and generally found it thin, and in ſpots all gone away, particularly when it grows near mowing time, though at the beginning of the year, it ſhall flouriſh amain.

But I muſt make another obſervation, and that is, that I do not remember through the whole county, ever ſeeing a piece of clover without rye-graſs amongſt it, either more or leſs.

And I obſerved alſo that wherever the rye-graſs was moſt predominant, the clover was weak and ſickly, and where the clover was moſt predominant, the rye-graſs was weak, but the latter was ſeldom the caſt, which may be compared to two men ſtruggling, one a ſtout, hardy, mountaineer, and the other a frothy, tender, delicate one, which muſt give way to that of a more hardy, robuſt conſtitution. This is juſt the caſe as it ſtands between the two graſſes.

The roots of them both are large and fibrous, and run horizontally, therefore feed in the ſame latitude, or among the ſame particles of earth, and of the ſame ſort of ſubſtance.

But the root of the rye-graſs is by much of the ſtrongeſt, tougheſt, hardeſt texture, it is longer in eſtabliſhing itſelf on the ground, as is evident, becauſe the clover flouriſhes moſt when young; but within the courſe of a few months, when rye-graſs has got eſtabliſhed, its own roots fill the ground, and bid defiance to all the oppoſition clover can make, and by mere ſtrength of nature, forces it to yield, which it does, and dies away inſenſibly.

I ſay nature, and not conſtitution, becauſe the conſtitution of clover according to its own nature, is as ſtrong as that of rye-graſs.

This puts me in mind of many arguments I have heard the Norfolk farmers endeavour to ſupport, in vindication of this great piece of miſtaken husbandry, viz.

That as clover has a ſoft, frem, tender root, and rye-graſs a hard, tough one, they do not both feed upon the ſame ſubſtance, though among the ſame mold, therefore are not improper to ſow together, with ſuch like weak arguments, that are ſcarce worthy an anſwer.

It is evident that inumerable different ſpecies feed upon, and are ſupported by the ſame food both in the vegetable and animal creation, though in the appearance and nature, they are quite different.

An aſh-tree is quite different in nature and aſpect from corn or graſs, yet it feeds upon the ſame ſubſtance, for ſo far as the roots reach, they take in all the ſubſtance of what ſhould feed the more dwarfy crop, as appears by the aſpect of ſuch crops when growing under them.

Human ſpecies and dogs feed upon the ſame food, yet I need not ſay how different in nature.

A horſe and a gooſe both feed upon graſs and corn, yet the former is not covered with feathers, no more than the latter with hair; every thing muſt bear in nature and reſemblance what their creator firſt gave them, it is not poſſible for all the art of man to change it.

May not a child from one ſtone weight be fed upon nothing but fowls, till he be a man of twenty ſtone weight, ſo that one would think there was nothing but fowl in his compoſition, yet it makes no alteration.

All this proves that clover and rye-graſs, tho' very different in nature, may feed upon the ſame food.

And reaſon tells us, that if there ſhould not be food or room ſufficient for both to ſubſiſt on, that the weakeſt muſt go to the wall, as the phraſe is.

And both occular demonſtration and experience may prove to the Norfolk farmers, that clover is not able to withſtand the reſolute robuſt attacks of the rye-graſs.

Rye-graſs is to clover a very weed, a ſort of ſcutch-graſs or quicks, the worſt of all weeds, and ought to be eradicated, not only from among clover, but from among all other crops, being very pernicious thereto, as well as impoveriſhing to the ground.

The Norfolk farmers admit that it runs or fills the ground full of ſcutch-graſs, which is ſaying as much as need, to prove it an enemy to the farmer's intereſt.

Indeed, if ſown alone, it can only hurt the land, therefore the conſequence is not ſo great, as when it preys upon both land, and deſtroys a crop of clover that is in every degree far ſuperior to itſelf.

If you tell the Norfolk farmers, that the evil they complain of is occaſioned by the rye-graſs being ſown among the clover as aforeſaid, they will immediately tell you no, that cannot be; for ſay they, we only ſow it thin, perhaps not more than one buſhel on an acre, whereas we uſed formerly to ſow three or four on an acre.

This is a ſort of contradiction in itſelf, for if they did not ſuſpect that it hurt clover, why ſhould they leſſen their former quantity; therefore it is plain experience taught them this.

However inſtead of lowering, they are heightening the evil, becauſe the thinner we ſow any ſort of grain, the more it ſpreads in root, and eſtabliſhes itſelf more firmly in the ground.

It is not much above twenty years ago, ſince rye-graſs became general in Norfolk; in thoſe days their clover crops were good, and would laſt two or three years, but now they will ſcarce ſtand one.

Their courſe of husbandry is to plough up their clover and rye-graſs ſtubble, when the ſheep have eat it bare, or that it is mown about Midſummer; they give two or three ploughings, and ſow it with either wheat or rye.

When the crop is off, they fallow the land for a turnip crop.

After turnips they ſow barley, and amongſt it clover and rye-graſs; ſo that between the graſſes being ploughed up and ſown again, there is only about thirty-one months, in which time there is a crop of wheat, a crop of turnips, and a fallow for each.

The graſs ſeeds are ſown along with the barley, ſo conſequently begin to grow, and to take on land at the ſame time.

I muſt own, were they to omit rye-graſs, and ſtick to clover, their method of husbandry would be excellent, becauſe their land is always in profit, or elſe in tillage, and that without loſing a year's rent by fallow.

What makes them ſo fond of rye-graſs, is, becauſe of its early ſpring growth for ewes and lambs.

Indeed every farmer would do well to

adapt a few acres for this purpoſe, ſown with rye-graſs alone, and let it lie as graſs land for ſix or eight years; here he would gain his ends without hurting any other land or crop.

However it muſt be confeſſed, the Norfolk people are the beſt turnip farmers in England, to take them in general.

Indeed the labour of hand-hoeing comes cheaper to them than in any other part of England, owing to the labourers being much accuſtomed thereto.

A man will hoe half an acre on a day the ſecond hoeing with eaſe, which is a trifling expence in compariſon of what it coſts in other parts of the kingdom, where people are intire ſtrangers to the branch.

If land be inclined to weeds, hoeing is abſolutely neceſſary, as it anſwers the end in a three-fold capacity, viz.

In deſtroying the weeds and improving both the land and turnips, and they are great ſlovens that neglect it, and deſerve to be pointed and laughed at by every one.

There is no land but what will throw up weeds, except trenched land, and though this may do better than any other without hoeing, yet the labour here alſo would not be thrown away.

The improvement the land would receive, by ſtirring and opening the mold to let the ſalts of the air thereamong, and by thinning the turnips to encourage their growth, will more than double pay the expence.

As far as I have tried trenched ground with turnips, (and one may tell by a little thing what a great one means) it is far preferable to any other tillage, which I ſuppoſe is owing to the ſtaple of the ground being deep.

The manure that lies at the bottom thereof encourages the tap-roots to ſtrike downwards, and feed thereamong.

Though the body of the turnip lies above ground, yet it is chiefly fed by the tap-root, which runs perpendicular to a conſiderable depth; and the beſt turnips has generally only one root, and that long and ſmall, with only a few ſmall fibres branching therefrom.

The next obſervation is, that any tap-rooted plant, ſuch as carrots, parſnips, or turnips, ſtrike deeper, and has a better root in ground that is pretty cloſe and firm, than when the land is too light and open.

In ſuch they grow forky, having many roots, which is productive of a very bad top.

Every ſenſible gardener will tread ſuch

light ground when the ſeeds are ſown, to pevent the ſaid evil.

This alſo ſhews that is is alike neceſſary for a farmer to roll his turnips or carrots as ſoon as ſown, if the land be light, particularly on trenched ground, as that will be more open and light than land that is only ploughed one furrow deep.

It is an agreed point, that land for turnips ſhould be well tilled, that the cleaner from weeds and the better.

It is the farmer's intereſt to ſow ſuch land with turnips as are tired with corn, becauſe it undergoes ſeveral operations to improve it.

If ſtubble land, it ſhould be ploughed as ſoon as the crop is off, and be well fallowed all winter, and till ſowing time, wich is about Midſummer following

But thoſe who chuſe to follow my

new method of trench-ploughing, will ſave much labour, and be much the ſurer of a crop.

My method is to ſow part of my crop on or as near the twenty-fourth of June as poſſible, and another part about three weeks or a month after, and when it is likely for rain, and in an evening.

By dividing your ſowings thus, the crop has not only two chances, but comes in at proper periods for ſheep to be turned therein, to eat them to the beſt advantage.

The firſt ſown will be ready to turn in about Martinmas, and the laſt ſown may be kept for ſpring feeding.

If you follow the old husbandry, the quantity of ſeed per acre is one pound, and in ſowing, take up what ſtays between one finger and thumb, and chuſe a calm evening to ſow it in.

Some will cover the ſeed by buſh-harrowing, but I find it beſt to roll it in as ſoon as ſown.

Tho' no manure comes amiſs for turnips, yet I never ſaw better crops than from aſhes after burn-beating.

They are fond of aſhes in general, but particularly thoſe burnt from the ſod.

However I do not approve the method, except it be wild, courſe, deep, ruſhy, or heathy land.

But where the land has a fine ſod, it is bad policy to burn it, becauſe a great deal of the ſubſtance of the land flies into the clouds; and let men argue as they will againſt it, I know both from reaſon and experience that it hurts land for the future.

It is a moſt vile cuſtom to burn ſuch kindly fine graſs land as I ſee is burnt in ſome parts of England, certainly no man would do it, were he to conſult reaſon, and look two or three years before him, and ſee what would be the conſequence.

It is true, he may be ſure of a crop by this method, and ſo might he by a good fallow, which would improve rather than hurt the ground.

If the ſod or graſs roots be reduced to manure in the ground, either by fallow or trench-ploughing, in ſuch caſe it leaves a laſting ſubſtance therein.

But moſt ſorts of land when burned, nine-tenths of the ſubſtance ariſe into the firmament; for lie a ton of ſods together, and when burned, they ſhall be reduced to two hundred weight of aſhes.

Let not any man deceive himſelf, by believing that all the manure ſtays in the aſhes, for that it does not.

There are ſeveral ſorts of enriching qualitis in the earth; but for brevity ſake, ſhall only mention two, viz.

Acid ſalts, and oily ſalts; the former is of a more ponderous nature than the latter, therefore while the fire is reducing or rather ſeparating the groſer particles of the earth from theſe manures, ſome of the heavieſt ſalts remain among the aſhes.

But the oily ſalts, which in fact are the richeſt and ſmootheſt food for plants, evaporate with the ſmoke.

We may know this by ſoot, for one buſhel taken from a chimney, will go as far for manure as twenty buſhels of aſhes taken from the hearth, and yet they are both rarified or divided from the ſame fire, and from the ſame groſs materials.

Therefore let us only conceive what a miſtake farmers lie under who raiſe manure by fire; I ſaid before, that they ſent nine-tenths into the clouds, but I believe much more, for I remember ſeeing a hay-ſtack burned that contained a hundred and twenty loads of hay, the aſhes it produced was not more than would manure half an acre of land; whereas if the ſaid hay had been reduced to dung by putrefaction, it would perhaps have manured twenty times the quantity.

In ſhort every combuſtible matter is very full of oily ſalts, it is thoſe that make them burn, and all ſuch matters leave very little ſubſtance behind them, they aſcend into the firmament, and are aſſiſting to compoſe the clouds that we ſee floating over our heads.

The turnips being ſown, the next conſideration is the proper time for hoeing them.

In this, as in moſt other things, people differ in opinion, ſome will hoe very young, ſome when half grown perhaps, and others condemn it all together, therefore will not hoe at all.

He that hoes when young, has the advantage of all the reſt, becauſe the tops being ſmall, the work is more quickly and ſafely performed, for when the leaves are large, and hang over, or cover the ground, it not only takes a great deal more time to look out and divide the beſt plants, but by being hid with leaves, except great care be taken, the hoe may reach to, cut, or wound plants one would wiſh to preſerve.

He that will not hoe at all is ſtill worſe, for then he not only lets the turnips ſmother one another if ſown thick, but permits weeds to grow to aſſiſt in deſtroying his crop, and alſo robs his land from a hoeing, which would be of great uſe to it, let the crop be as it will.

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CHAP. IX.

On different ſorts of Turnip-ſeed.

THE following are a liſt of various ſorts of turnip-ſeed, that are chiefly in cultivation at this preſent time in England.

Firſt, the large Norfolk ſheep turnip. It ſtands the winter well, and grows to a good ſize ; the apple or body of the turnip grows all above ground, has a large top.

Second, the early red top turnip. This alſo grows large, but does not produce ſo much weight upon an acre as the firſt ſort, which is owing to its flat ſhape.

It has a ſmall top, which is of a darkiſh green colour nearly approaching to red.

The upper part of the turnip has a reddiſh caſt, a thin skin, a handſome ſhape, and is a ſweet eating turnip, and the ſureſt of all others for a crop.

I have more than once ſown a mixture of turnip-ſeeds in one field, by which I have proved it to be the ſureſt of all others for a crop.

In ſhort it is my favourite, but as it is an early turnip, it ought to be eat firſt, and a proportionable quantity of the Norfolk ſort ſown, and kept for ſpring feeding.

Thirdly, the yellow turnip. This is a ſmall ſort, and is chiefly cultivated by gardeners for the table.

It is a mild taſted turnip, and the inſide when boiled, is of a yellowiſh colour; I have ſown it in the field, but its growth is rather dwarfy.

Fourthly, the turnip cabbage. This is a ſpecies of the turnip kind that has not long been in vogue, it has the two names of turnip and cabbage, becauſe it reſembles both.

The turnip is in colour like a cabbage ſtalk, and in ſhape like a nine-pin, (for it ſwells in the middle to that form) between the leaf and the ground, and if well grown, is much about the ſize of one, but the leaf or top is much like that of a cabbage, yet it never turns to one; but always keeps ſpread and open like cole-ſeed. [See the chapter on turnip-cabbage.]

Fifthly, the turnip rooted cabbage.

I am much at a loſs how to find out from whence or why the name of cabbage ſhould be added to that of the turnip, ſince no part of the plant has any reſemblance to a cabbage.

It is nothing elſe but a turnip in every ſenſe of the word, and if any one who has a turnip field will look it carefully over, he moſt likely will find many of theſe plants among his common turnips.

They are known by what is called a bad appling turnip, or one that does not turn well, and I have many a time weeded them out of my crop as one of an inferior ſort, and which has been moſtly the caſe with all farmers.

I always looked upon ſuch plants to be the ſport of fortune or chance, rather than nature, however, I am rather inclined to think, that both nature and chance are concerned in giving them an unkindly turn.

Becauſe I have ſorted the ſeed, and ſown it ſeparate, and found that it moſtly produced turnips of the ſame ſhape, though not altogether ſo; for by the great chance, that we find a bad turned or parſnip-like turnip grow among ſeed that has been carefully tranſplanted, and ſaved from turnips, that was of a handſome round and flattiſh ſhape, (for on ſuch, choice is always made for ſeed) by the ſame chance I ſay, we may find a handſome well turned turnip among theſe bad turned kind.

Tho' no ingenuity can change the nature firſt given by its creator, yet experience tells us that we can both help and deform nature.

Help it, by always preſerving ſeed from the moſt beautiful kind, or, on the other hand deform it, by making a contrary choice; and tho' I am apt to believe, that what is called the turnip rooted cabbage is no more then a deformed turnip, and the ſaid deformity kept ſeperate and improved upon, yet as it is a point that cannot be abſolutely determined, but there will always be room to give plauſible reaſons to the contrary, I ſhall not be too ſanguine in my aſſertions, but juſt deſcribe the turnip as it grows.

The turnip rooted cabbage is of a longiſh ſhape, almoſt like a nine pin, but not ſo thick in the middle, has a large tap-root, it ſtrikes deep, and the body of the turnip is almoſt buried under ground like a parſnip.

The top or leaves like a Norfolk turnip, except inſtead of all the top growing out of the crown of the turnip, little ones grow out round at a diſtance from the crown; it keeps green or growing all winter, becauſe it is deep in the ground.

In ſhort, one of theſe turnips bears the affinity to the handſome round well turned turnip, in the ſame degree, as a ſcallion does to a handſome well turned onion; for tho' onion ſeed be all ſaved from a well turned onion, and ſown on the ſame ground, yet ſome will produce good onions, and ſome ſcallions.

The latter grows with a thick neck, and grows deeper in the ground than onions, and keeps growing all winter in the ſame nature as turnip rooted cabbage.

Therefore inſtead of giving the name of turnip-rooted cabbage, were we to give them that of turnip ſcallions, we ſhould be perhaps nearer the real thing, as I am apt to think their degeneracy from the real turnip ariſes from nearly the ſame cauſe as the ſcallion from the onion.

However, be this how it will, they may be uſeful in their place, as ſpring food for cattle, as ſcallions are inſtead of ſpring onions for the table; but ſhould they be a ſpecies of turnip different from all others, which I rather doubt, I know that they are ſown in the ſame ſeaſon, and managed in the ſame manner as the Norfolk turnip.

The beſt crop I ever ſaw the turnip-rooted cabbage produce, was ſown by a gentlemen three miles from Dublin.

The land was ſown about the firſt of July in drills, to the amount of about twenty acres in one cloſe.

The land a good loomy clay, rather inclined to be ſtrong, the rows at about eighteen inches aſunder.

They were very carefully hoed with the plough, and thinned to a proper diſtance by hand-hoeing the length way of the rows.

The crop was extremely good, and very even all over the cloſe.

I was by at weighing a ſquare perch, and by the moſt exact calculation, the cloſe produced forty-ſix tons and a half upon an Engliſh acre.

They were kept for ſpring-feeding.

The ſame gentleman had about thirty-five acres of the large Norfolk turnip, on the ſame ſort of ground, parted only by a fence, and which were managed by the ſame good husbandry as the former ſort, and the crop was very good.

I alſo was by at weighing a ſquare perch of theſe turnips, which produced about fifty-one tons on each Engliſh acre, which out did the uurnip-rooted cabbage by five tons and a half each acre; the land was well fallowed, but not manured.

This was a fair trial, and both the crops were brought to the height of perfection.

I have made two trials in England, one upon loomy clay, and the other upon ſand.

The turnip-rootted cabbage produced at the rate of forty-three tons per acre, upon loomy clay, and the red top turnip forty-nine tons upon an acre.

The ſeed was ſown in the common broad-caſt method, and hand-hoed twice.

The land was wheat ſtubble, and fallowed from Michaelmas to the time of ſowing, got eight ploughings and two harrowings, but got no ſort of manure.

The turnips of both ſorts were ſown at or about Midſummer, and was rolled in without buſh-harrowing.

My trial upon ſand land, as well as many other obſervations I have made, proves beyond a doubt, that turnip-rooted cabbage likes clay or ſtrong land beſt.

This experiment ſtands thus:

In the laſt year I ſowed an equal quantity of clover leay, well fallowed, the land dry and ſandy, with red toped early turnip and turnip-rooted cabbage ſeed.

Both the ſeeds were ſown on one day, and both ſteeped in the pickle as deſcribed in this book.

Though both the ſeaſon of ſowing, and land was very dry, yet both the ſeeds came up very quickly, and neither of them ſuffered from the flie.

The ſeed was ſown very even, and ſome of it put down grain by grain, at one in the middle of every ſquare foot, as deſcribed in my new husbandry.

As the land had been well tilled, it was pretty clear from weeds, therefore it only got once hand-hoed.

The average produce in the turnip-rooted cabbage was only thirty-one tons per acre, and that of the red topped early turnip, was at the rate of ſix and forty tons per acre.

Therefore I ſay, this, together with other correſponding circumſtances, ſhew that turnip-rooted cabbage is fonder of ſtrong land than that of a light ſandy nature.

A Table of expence and profit of an Engliſh acre of turnips, when eaten on the ground by ſheep.

	l.	s.	d.
There is no doubt but a tolerable acre of turnips will feed fifteen ſuch weathers as will coſt in autumn twelve pounds a ſcore; and by the common courſe of things, there is likewiſe no doubt that when fat, and by the advance of markets, they will give in April twenty-four pounds a ſcore, which leaves a profit to the farmer of	9	0	0
If the turnips grow upon fallow, I allow eight ploughings, which if done with one man and two horſes, will be worth two ſhillings and ſixpence each ploughing - -	1	0	0
	1	0	0

Brought over	1	0	0
To harrowing, ſowing, and rolling	0	2	0
To ſeed	0	0	6
Attending the ſheep in ſhifting the houſes, &c.	0	15	0
To market-expences	0	10	0
To half a year intereſt for twelve pounds	0	5	0
To land-rent	0	15	0
Total expence	3	7	6
Clear profit	5	12	6

CHAP. IX.

Remarks and illuſtrations on the foregoing Table, together with the method of feeding bullocks, &c.

IT is a common thing with good farmers to make double the price of their turnip-fed ſheep in April, coſt what they will in autumn, as appears by the foregoing table.

I have given good allowance in ſaid table for all labour or attendance, as I would not leave it in a farmer's power to even think that I would flatter him into any ſcheme, by ſhewing a great profit at the end of a tote up, without allowing him ſufficient for his labour, while he is executing the ſame.

Again, I have omitted in the table taking notice of the ſheep dunging the land, by eating the turnips, which may juſtly be accounted worth thirty ſhillings an acre, and the fallow is thirty ſhillings more; therefore we may moderately deem the land three pounds better for this dreſſing, and this too, without the loſs of a fallow-year; alſo a farmer gets the profit of his land in his pocket in April, and he could not expect it much ſooner, had it been under any ſort of corn: all theſe conſiderations a farmer ought to bear in mind, for if he do not impartially reckon every thing that makes for and againſt himſelf, from the ſeed going into the ground, to the money coming into his pocket, he never can be a right judge what ſcheme to purſue for his own advantage.

Feeding bullocks on turnips is another method practiſed by ſome farmers, but this falls ſhort in profit of the ſheep-feeding ſcheme, except they be comſumed on the land in moving houſes; for though bullocks clear double their firſt coſt, and make as much produce out of an acre, yet the expence is greater in attendance, in the old method; for they are tied in a houſe, therefore the turnips muſt be carried to them. Every twenty bullocks will take two horſes and two men to attend on them when thus confined at home.

Again, the land loſes the benefit of the manure, being very conſiderable in what it would gain by ſheep.

It is true, bullocks make ſome manure, but it is very inconſiderable, as the turnips paſs through them, chiefly by urine.

The bullocks that are fed by turnips muſt never be watered, or go out of the houſe from their firſt being put in, till they go to the butcher, for the turnips ſupply them with water enough; and if they be let at liberty, to run or play, it will heat and diſturb their bowels, inſomuch that the turnips will paſs through them too quick, before they have time to fulfil their office by digeſtion.

Some farmers manure their meadow-lands by feeding ſheep upon them with turnips; but though they gain in one place they loſe in another, and they alſo add a multiplicity of labour and expence thereto by pulling up and carriage, which they will very ſenſibly feel in fifteen or twenty acres of turnips: however, every one knows his own ſituation the beſt. If he be diſtant from dung for his meadows, this method of feeding ſheep upon them will give an excellent dreſſing.

Some feed their cows and dry cattle on their meadows with turnips, but this is a bad way, for the cattle ſpoil and tread the land; neither are turnips a proper feeding for cattle that run about, no more than for a working bullock.

CHAP. X.

On preſerving turnips good for ſpring-feeding.

IT always has been a cuſtom among gardeners, when they want to preſerve turnips, carrots, parſnips, &c. good for the table in ſpring, and keep them from growing, is to bury them in dry ſand.

Were we to take a curſory view of this method, without entering thoroughly into the merits of the cauſe, we might think it a very judicious good way, and one that might be extended to preſerving theſe vegetables good for ſpring feeding for cattle.

But if we look more narrowly into this affair, and withal conſult reaſon, we ſhall find, that inſtead of retarding vegetation by this method, it will forward the growth thereof.

Turnips are full of a juicy ſubſtance, and though ſand be ever ſo dry when thrown among them, yet they naturally ſweat when packed together, therefore communicates a moiſture, which together with the natural hot quality of the ſand, raiſes ſtill a greater heat, and every one knows that moiſture and warmth are two qualities which force vegetation, and the vegetation of ſuch roots is the firſt thing that helps to render them uſeleſs, for being out of ground they grow till all the growing quality be exhauſted, after which they putrify, and are obnoxious for food.

Chuſe how general the practice of burying among ſand may be, yet the above are truths and reaſons which muſt carry conviction along with them to every reaſonableman, but thoſe who doubt it, can eaſily be convinced upon trial.

The eaſieſt and beſt method to preſerve any ſort of roots from vegetation, and ſo conſequently keep longeſt good for food, and particularly turnips, is to ſtack them up in ſtraw.

The method is ſimple and eaſy, one load of any ſort of dry ſtraw, is ſufficient for to preſerve an acre of fifty tons weight of turnips.

You muſt place the houſes ſo as to leave every third ridge without a houſe going on it; you muſt pull up the turnips of this ridge, cut off the tops and tap-root, and give them to the ſheep in the houſe next to ſaid ridge as it goes along.

Throw the turnips in a ſort of a windrow on the middle of the ſaid ridge, ſo let them lie a few days, and let what weather will come, they will take no damage.

When you think there are as many pulled as will make a heap as large as a large hay-cock, you muſt then make them up in that form with dry ſtraw.

Firſt, lay a layer of ſtraw next the ground, and upon it a layer of turnips about half a yard thick, then another layer of ſtraw, ſo go on alternately laying a layer of ſtraw and a layer of turnips; every layer grows narrower, till it comes to nothing at top like a ſugar loaf.

The laſt layer muſt be ſtraw, which ſerves as thatch to keep all dry.

You muſt obſerve always when you have laid a layer of turnips, to ſtroke or lap up the ends of the under layer of ſtraw over them, in order to keep them cloſe, or from tumbling out.

You ſhould have in readineſs ſtraw in the field, made in little cocks, whereabouts you think the heaps of turnips will be.

In ſpring, when you want to eat the turnips, you muſt run the houſe up ſaid ridge, and throw them into the rack; you will ſcarce ever have the turnips above thirty or fifty yards to carry, and the land is manured as well as the firſt, and the turnips by this method are preſerved freſh, ſound and juicy.

When they ſweat, as the ſtraw imbibes the wet or watery particles, it prevents vegetation.

This method will anſwer the ſame end as to parſnips, carrots, or potatoes, &c.

For want of ſtraw, old ſtack bottoms,

ruſhes, or ſtubble, may anſwer the end, provided they are dry.

No one that has turnips but ought to follow this practice, as every one knows, that if the weather be mild, they will begin to grow about the latter end of February, after which they grow every day worſe and worſe for feeding.

As the ſubſtance grows into the top, it leaves the turnip dry and woody, therefore the ſheep or cattle do not like them, ſo conſequently do not feed kindly thereon.

CHAP. XI.

A pickle to prevent the flie from deſtroying young turnips, ſmutty wheat, &c.

UPON reading the head of this chapter, ſome of my readers may want faith to believe it; therefore in this, as in other caſes, it may not be amiſs to give ſome reaſons how the pickle takes place, to prevent this malady, which few words may explain.

I ſuppoſe it would not be hard to make any farmer believe, that were we to daub every leaf over with brimſtone, or ſuch like poiſonous obnoxious qualities, that it would hinder the flie from preying thereon; but, ſays he, how is it poſſible that ſteeping the ſeed (tho' in ever ſo obnoxious a liquor) can hinder them from preying upon the leaf?

We muſt conſider that the damage retained from the flie, is when the turnip is in its ſeed leaf, the ſaid leaf being ſoft and tender, the flie feeds thereupon, and the bite thereof is very poiſonous to the plant while in its infant ſtate.

But after it gets out of the ſeed leaf, it is ſafe, becauſe the ſecond leaf is armed or covered with a kind of down or beard, that is ſo thick ſet and pointed, that the flie cannot come near the leaf to feed thereupon, by which means the plant is preſerved.

Upon turning to the chapter on ſmutty wheat, you will ſee that the very reaſon why the pickle prevents the worms from preying upon the root, and cauſing ſmut in wheat, in the like manner it operates upon the leaf in turnips, and prevents the flie from preying thereon.

The nature of a grain of wheat and that of turnips are quite oppoſite, for the bran or husk of wheat ſtays in the root in the ground, whereas that of turnip ſeed riſes upon the leaf.

In ſhort the leaf of all oily plants are lapped up in the ſeed in miniature, and when raiſed into vegetation, the ſeed, as it were, unfolds or opens itſelf all into leaf; this is what is generally called the ſeed leaf.

And very properly too, for the leaf is

the ſeed itſelef, which being unfolded, takes the form of a leaf upon it, tho' it is not laſting, for as ſoon as the root begins to feed upon the ground, it throws out another of a harder kind, which as before obſerved, is covered with a ſort of a down or hair, and then the ſeed leaf falls off or inſenſibly dies away.

Therefore it is no wonder, that the ſeed leaf ſhould retain an offenſive ſmell or taſte, which is very ſuſceptible to theſe diminutive inſects, whoſe ſenſe of ſmell and taſte are in proportion to their ſize; and the ſeed being ſteeped in a poiſonous nauſeous liquor, the leaf wherein lies their food, retains the ſaid nauſeous quality, which they are ſenſible of, therefore forbear feeding thereupon.

I do not ſay that the pickle will kill them, tho' it is not impoſſible, ſhould hunger inforce them to feed upon it, which is ſcarce probable; but if it prevents them from doing damage, it anſwers the end deſigned, and this I can, from experience, vouch that it will.

However to be more ſecure, I would adviſe always to ſteep one half of the ſeed, and ſow the other half unſteeped.

Should the flies be very predominant and hungry, they will feed upon that which was not ſteeped, till the other has got into the ſecond leaf; and if one half grow, it will do more than feed the ground, for there are more grains in half an ounce of ſeed than ſquare feet in an acre, were they properly placed.

Therefore I ſay, if a farmer ſows his uſual quantity of ſeed, which is a pound upon an acre, one half ſteeped in the poiſonous pickle, and the other half unſteeped for the flies to feed upon, he need not fear a crop, be the flies ever ſo numerous, for the half pound that is pickled, will be more than ſufficient ſeed for his land.

Some people will ſow half new ſeed and half old, which is a ſenſible way, for the new ſeed comes up three or four days earlier than the old, therefore, ſay they, the flies are feeding upon the new ſeed until the old gets into the hairy leaf.

Tho' there may be ſome reaſon in this, yet I know from experience, that the ſucceſs is not ſo certain as to pickle half.

For being importuned by a gentleman in the Society of Arts and Sciences, to ſow half new and half old ſeed, (as he aſſured me it would anſwer the end) I ſowed a field variouſly prepared, with ſeed, ſome by this method, ſome by pickling all the ſeed, and ſome half pickled, and half unpickled.

The trial was very fairly decided in favour of the laſt method, for it happened to be a dry time, when flies were very predominant, therefore gave a fair opportunity to reduce it even to a certainty.

The Receipt.

TO every gallon of old chamberley, add three ounces of copperas, two quarts of train oil, half a pint of the oil of turpentine, three ounces of the balſam of ſulphur, three ounces of nitre, one quart of bullocks galls, which may be got of the butchers, bruiſe and ſqueeze therein a dozen of heads garlick, add as much ſoot as you ſee will make it of a thick ropy ſubſtance, in order that as much as poſſible of the liquor may be left ſticking about the grain, that it may gather a thick coat, when mixed with the compound powder, which will aſſiſt as manure, as well as a preventive againſt vermin.

When all the above ingredients are mixed, add to the liquor two quarts of bay ſalt.

The longer all theſe are mixed before you want them, the better, becauſe they will then have ſufficient time to mix and incorporate together, by which means the mild ſmooth ingredients will ſoften or meliorate thoſe of a more harſh churliſh nature, therefore be in leſs danger of deſtroying the growing quality of the ſeed.

In this liquor ſteep your ſeed ſix or eight hours, then take it out and preſerve the pickle for farther uſe; mix the ſeed with the following compound of powder, viz.

The compound manure.

TO every peck of aſhes, take half a peck of ſoot, half a peck of lime, one pound of roſin, and one pound of brimſtone in powder, mix all well together, and ſift it through a fine ſieve, in order to take out all the lumps; ſpread ſome of this powder on a table thin with a ſieve, (which will let through the ſort of ſeed you want to mix) ſift ſome of the ſeed over it, and mix or rub it with your hands, in order to candy it over with as thick a coat as you poſſibly can.

It is beſt only to mix a little at a time, and when it grows too dry, ſprinkle a little liquor over it again, until you enlarge the grains to the ſize you would wiſh, the larger the better.

The ſame pickle, powder, and management, will do for any ſort of corn, ſeed, or grain, that you would ſow in the manner as deſcribed with my new invented tranſplanting machine.

In ſhort, was I to ſow ever ſo much in the old broad-caſt method, I would prepare it in the above man ner; but as many farmers which ſow great quantities, may not chuſe to take the ſame trouble with all their ſeed, ſuch may ſteep their grain in the general pickle for ſmutty wheat.

There is one thing, as directed in the next chapter, which I beg to take notice of before I leave this ſubject, and that is, to aſſure my readers, that neither this pickle, nor the general pickle for ſmutty wheat, will deſtroy the growing quality of any ſeed when ſteeped therein for any reaſonable time.

Which is not the caſe with ſome pickles which have been preſcribed in other books of husbandry; I have myſelf loſt a crop of wheat by ſteeping the ſeed twelve hours in a ſtrong ſalt pickle, wherein was mixed one pound of coperas to every fifteen gallons of liquor. I have alſo known ſeveral other farmers to meet with the ſame fate by the ſame ſort of pickle.

Indeed there is no general rule without an exception, for I have known wheat to have its growing quality deſtroyed in ten or twelve hours, when other wheat has lain forty-eight hours in the ſame pickle without being hurt.

At firſt ſight this may ſeem very amazing, but however it is eaſily accounted for, as it is all owing to the ſtate or dryneſs of the ſeed when put into pickle.

If old dry wheat be put into pickle, it

will retain its growing quality a long time, becauſe the body is ſo cloſe, hard, and obdurate, that it reſiſts the keen ſharp ſearching particles of the liquor for a time, and only lets it penetrate by degrees.

Whereas, on the other hand, if the grain be ſoft and full of water, its pores are all open and tender, therefore the ſharp particles of the liquor ruſhes in and ſeizes it all at once, when in this open unguarded ſtate, and may do more hurt to the growing quality in one hour, than if in the former caſe, it would do in twenty.

The reaſon that my pickle does not ſo quickly affect or deſtroy the growing quality of ſeeds, are becauſe the ſharp acid and poiſonous particles of ſome of the ingredients are checked, molified, or let down, by the ſmooth particles of the oils, but yet at the ſame time does not deſtroy the force of the ſaid ingredients from taking place.

Moſt people own that oil is an antedote for poiſon, and alſo that if ſpirits of turpentine, or ſuch like hot oils, be applied to a horſe for a ſprain or the like, they will fetch off the hair, but if mixed with any ſort of oil or greaſe, it will prevent them from having that effect.

In ſhort, numerous hints might be quoted, to ſhew how neceſſary it is to add oil to pickle, in order to ſmooth and qualify and bring it to a proper conſiſtence, ſo as not to be injurious to the growing quality, was it is of no other real uſe, but it certainly is.

The chief object of theſe aforeſaid ingredients being mixed all together, and called a pickle, are to prevent flies, worms, or any thing that are of the nature of theſe ſpecies, from preying upon or damaging our crops.

Moſt grubs or worms are the parents of flies, therefore what is poiſonous or obnoxious to one, muſt be alſo offenſive to the other.

Now all the ingredients which compoſe the aforeſaid pickle, are jointly and ſeparately antedotes againſt either flie, or grub, or to both; as for inſtance, rub a horſe over with train oil, and ſo long as the ſmell remains, a flie will not bite him; ſulphur, ſoot and chamberley, are alſo their averſion, and ſo are lime, ſalt, turpentine, copperas, roſin, galls, and garlick, antedotes againſt the worm and grub tribe.

The above liquor is not expenſive, and will abundantly enrich the crop, particularly if the ſeed be well coated over with the compound powder, therefore would adviſe it to be applied to the three following grains, viz. wheat, barley, and turnip-ſeed.

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CHAP. XII.

General pickles for wheat.

THE following is a general pickle for wheat, to be uſed by ſuch farmers as ſow great quantities, and will not go to the expence of the above pickle and powder, viz.

Take a tar hogſhead, let it into the ground, with it's top even with the ſurface in ſome bye place, having a cover thereon.

In this keep chamberley from one ſeed time to another, the older it is and the better; in this throw all the bullock, ſheep, hogs, or any ſort of galls you can get, the more the better.

In each hogſhead full of liquor put two gallons of train-oil, a great many heads of garlick bruiſed, one pound of copperas, one pound of nitre, and one ſtone of bay-ſalt; ſteep the ſeed therein eight hours, and skim off all the light ſeed that ſwims at top, then take it out, and on a floor mix it with quick lime and ſoot, of each an equal quantity, till it be of a conſiſtence proper for ſowing.

It has always been a maxim for farmers to ſow new wheat, thinking that old would not grow, but they may reſt aſſured, that it is rather better than new, and particularly if ſteeped in this pickle.

And would they come generally into this method of ſowing old wheat, it would ſave them a great deal of hurry and trouble in threſhing out ſeed-wheat in the buſy wheat-ſeed time.

But thoſe that ſow new wheat, I would adviſe them to have it as dry as poſſible, before they put it into the pickle: if the ſeed be well candied, no fowls, ſuch as crows, pigeons, &c. will touch it, neither will field mice eat it.

I might add ſeveral other pickles, but ſince I know the above to anſwer every good end of enriching the ſeed, preventing all ſorts of vermin, and worms, grubs, flies, &c. from damaging the crop, and as the ingredients are cheap, and may be got in any country town, I think it would be in vain to perplex the farmer's ideas with any other.

The laſt year I ſteeped ſeveral ſorts of grain twenty four hours, notwithſtanding I believe every grain that was ſown grew.

CHAP. XIII.

How to clean black or ſmutty-wheat without waſhing.

THOUGH the foregoing pickles may prevent ſmutty-wheat, yet if by neglect, ignorance, or any other unforeſeen accident, it happen that the farmer do not apply it, and that his wheat be black or ſmutty, the eaſieſt and beſt remedy to cure the malady, by taking off the ſmut, is to threſh it in ſand.

The wheat being threſhed and winnowed in the uſual manner, if any ſmut be thereamong, it will appear at the downy ends of the grain, for when the balls, are broke, the incloſed powder being of ſo exceſive a light, fine nature, it ſticks among the down, or in any other crack or crevice that may happen to be in a grain of wheat, and when it comes to be ground, it mixes with the flour, and makes the bread black and diſagreeable.

The uſual method is to waſh it in clean water, but it is not only vaſtly troubleſome to get dry again, but it ſpoils the beauty and brightneſs of the grain, neither will it ever make ſo fair puddings or bread as others which are clear from this malady.

The corn being winnowed, be provided with a cart load of dry, ſharp ſand, ſuch as is generally uſed to mix with lime for mortar, ſift it through a fine ſieve upon the threſhing floor, about three inches thick; then ſpread the wheat over it about two inches thick; being thus prepared, threſh it as you would barley, when you want to take off the ones or beards.

This done turn it up to one corner with a ſhovel, and ſpread as before the floor again with more clean ſand.

Then ſift out the ſand from the corn that is already threſhed, and throw it over the clean ſand and give it another threſhing, which two threſhings will effectually clean it from ſmut.

The cleaning ſand will ſerve for the firſt threſhing of another floor full, but it cannot be effectually cleaned without once ſhifting and threſhing in a ſecond ſand.

One man may, by this method, clean three or four quarters on a day; the ſand ſcours, cleans, and brightens the corn; and if upon laying it on the floor you ſift it through a fine ſieve, the ſame ſand will run through the ſame ſieve when ſeparated from the wheat, and the wheat will ſtay in the ſieve.

CHAP. XIV.

A compound manure to improve land, and alſo to prevent the red or cut worm, and the ſlug from deſtroying green corn, &c.

IF my pickles for wheat or turnip-ſeed be duly attended to, and the grain candyed with a thick coat of manure, it will be a great means to prevent any inſect of the worm, grub, or ſlug tribe, from preying upon the crop, for it is ſo extremely offenſive to them, that they do not care to ſtay in the root where it is, except the land be very full of them, and other food, ſuch as weeds, graſs, &c. be ſcarce, in ſuch caſes hunger may force them to eat what they did not like, therefore ſhall propoſe other remedies that will more immediately fall upon their food, and prevent them from eating thereon; but ſhall firſt give a deſcription of the grub that does the moſt damage to corn in its green ſtate.

The cut worm, or by ſome called the red worm, is of the grub or maggot kind, it is about three quarters of an inch long, and is about the eighth of an inch diameter, the body is of a pale yellow colour, but its head is almoſt black, or of a deep red; it has a ſort of feet, but by nature is extremely helpleſs as to motion or movement, one can ſcarce ever ſee it creep; if a plough or ſpade throw it above ground, it is long before it can get itſelf again covered with mold.

Therefore if land be often turned up with plough, harrow, or other inſtruments, they are quickly deſtroyed by the fowls of the air, when expoſed thereto.

Their food lies in the roots of graſs, corn, or other vegetables, which are ſoft and juicy; the greateſt damage they do to green corn is from about the beginning of April to the latter end of May.

They cut the corn off, as if cut by a knife, about an inch within the ſurface of the earth, ſo that the top dies away, and the crop is intirely loſt.

I have ſeen a cloſe containing twenty acres of wheat, which was a fine crop the latter end of April, but by the latter end of May was all deſtroyed, ſo that the land was obliged to be ploughed up in June.

In ſhort they are a very deſtructive creature; I have tried many experiments to prevent the crop from being deſtroyed by them, but found none ſo effectual as the compound manure as follows, viz.

To every ten buſhels of ſoot mix ten buſhels of any ſort of dry aſhes, ten buſhels of unſlecked lime, ten ſtone of bay ſalt, ten pounds of ſulphur.

Take out of the hogſhead five gallons of the pickle for wheat, and add to it five quarts of galls, which you will get at the butchers for eight-pence a quart, and five gallons of train oil, mix theſe together; having all the above articles ready provided in ſome out-building, (for they muſt be kept dry) have three or four perſons to mix them.

Firſt ſpread on the floor a layer of aſhes, then a layer of lime, then a layer of ſoot, then a layer of ſalt; a perſon all this time muſt be ſprinkling on the liquor, and another perſon dridging on the ſulphur, in order to mix every thing as even as poſſible together.

Being thus mixed, be provided either with a cart load of dry aſhes, or for want of theſe, a cart load of fine dry mold out of a fallow field, with which the compound muſt be cloſe covered, in order to keep in the ſteam or vapour, which will naturally ariſe from the heat of the lime when ſlecking, and the reſt of the compound fermenting together.

When thus mixed and covered up cloſe, let it lie three or four days or longer, if you do not want it; in this time the lime will be ſlecked and fallen to powder, and the heat thereof will dry up the liquor, ſo that when the compound is turned and well mixed, it will be a dry powder. In turning and mixing the compound, you muſt mix along with it the aſhes or dry mold that covered up the heap; when thus mixed, let it lie a few days longer; in order to incorporate together, as the longer it is made before it is wanted, the better, for it improves by age.

Chuſe a calm dewy morning or evening to ſow it in, the duſt falls upon the blades of the corn, and being wet, it ſticks thereto, and next rain or dew that comes waſhes it down the ſtalks to the root, the nauſeous poiſonous quality of which prevents the grubs or worms from feeding thereon, and alſo being a rich manure, it encourages the growth of the corn amazingly.

A table ſhewing the expence of the compound manure, for five acres of ground.

To ten buſhels of ſoot, about	0	7	6
To ten buſhels of aſhes, perhaps - - -	0	0	6
To ten buſhels of lime, about	0	2	6
To ten ſtone of bay ſalt	0	10	0
To ten pounds of ſulphur, if it be to prevent the red-worm, or the ſlug, but if as manure only, it may be omitted	0	6	8
	1	7	2

Brought over	1	7	2
To ten quarts of galls, which may be bought at the butchers, but except the manure be to prevent vermin from deſtroying the crop, this alſo may be omitted -	0	6	8
To five gallons of train oil, which muſt be mixed among the five gallons of liquor taken from the pickle hogshead - - -	0	15	0
	2	8	10

If ſoot cannot be got, add double the quantity of lime, which will nearly anſwer the ſame end.

This quantity is ſufficient for five acres of land, and may be applied as a top-dreſſing for any ſort of land or crop, and will improve it paſt conception.

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CHAP. XV.

A lecture upon cattle and ſheep, ſhewing how they lie on fat and lean, and alſo how the ſheep takes the rot, to prevent it, &c. &c.

THE rot of ſheep is very common, and in ſome wet ſeaſons and ſpots of ground almoſt general, and though perhaps the malady is of as long ſtanding as the ſheep themſelves, yet not an author which has wrote upon this uſeful creature, has handled this ſubject properly, that is, to point out by philoſophy, the riſe and progreſs of the diſorder, ſo conſequently muſt fall ſhort of preſcribing a remedy therefor.

The long experience the world has had of the returning wet ſeaſons bringing on this malady, leaves it beyond a doubt, that the riſe thereof proceeds from abundance of water, but how this water operates ſo as to bring on this malady, is the queſtion?

Many arguments both verbal and written, I have heard upon the ſubject, one aſſerting, that it proceeds from the ſheep taking in with their food worm-ſprouts and dirt, which is generally thrown up in great quantities in wet weather.

Others, that it proceeds from the ſheep taking in with their food cobwebs, which are always very predominant in wet and warm weather, inſomuch, that the graſs is moſtly covered with them.

Others aſſert in general terms, that rot proceeds from water, but without refining upon the ſubject ſufficiently enough to open our ideas, and prove where a remedy can take place.

The following ſhort letter will ſhew the improbability of the two firſt problems being the cauſe of rot, and alſo prove that water is the cauſe thereof, and where it takes place, which being fully known, the thing itſelf points out a cure.

I know no animal of the brute creation we have in England, (or indeed any where elſe) that will live ſo long upon dry food without water as ſheep, rabbits, and hares, neither are there any creatures that are ſo ſubject to rot as theſe.

A ſheep may be reared upon the higheſt and dryeſt lands in the hotteſt ſummers, and never deſire water, and yet they will drink if they come where it is; they will alſo bear a great deal of water, if it be proportionally mixed with ſalts, as appears by them living and feeding upon turnips, which are a very watery root, but then this is mixed with a proportionable quantity of ſalts.

There is likewiſe no ſort of graſs that grows up more quick, or is fuller of water, or juices, than that which grows on ſalt-marſhes, I mean on ſuch land, as has been either gained from the ſea, or where the ſea ſometimes overflows, yet ſheep will never rot upon it.

So far from that, it has been often known for ſheep to knit or recover (which has been tainted aforetime) when put thereon, the reaſon is, that though ſuch graſs be full of water, yet it is alſo full of ſalts, which checks the redundancy of water from doing the miſchief by rot it otherwiſe would, and which are generally done by waters that are diveſted of ſuch ſalt particles.

Having given theſe hints, I ſhall now proceed to ſhew where and how the rot takes place.

The word rot, ſignifies a putrefaction or a decay of the liver.

The animal body is enlarged in the various ſorts of fat, lean, blood, bone, &c. by a vapour or ſteam that ariſes from the maw, and which diſperſes itſelf as ſuch, through the whole animal body.

The mouth is take in food, and the maw is a repoſitory where it remains till the heat thereof brings on a fermentation, after which comes a corruption, and then a digeſtation, which is a ſeparation of particles into the ſmaller bowels, where there are ſtill a greater degree of heat which cauſes a rarefaction, that is, it rarefies and ſeparates the moſt oily rich particles of the food from that of a more barren nature.

The latter of which is voided as excrements, but the former penetrates or evaporates through the skin of the bowels, in a ſteam or vapour, and is diſperſed to different parts of the body, ſome as bone, ſome as fat, ſome as lean, and others as water or urine into the bladder.

In all evaporating matters, that of the moſt corroding nature, flies off firſt, and this is what lays on or feeds the bone;

the next degree lays on the lean and ſinews, and that of a more mild, ſmooth nature, lays on fat.

Theſe being the richeſt particles that are impregnated with food, are the firſt that ariſes into ſteam, are rarefied and thinned into very fine particles, and then penetrates through the whole skin of the bowels, and are diſperſed through the whole frame of the body, and adhere to each part, according to its nature as aforeſaid.

The next ſubſtance that paſſes or evaporates through the incloſure of the bowels, is water or urine, and as all food is mixed with a greater quantity of this than the aforeſaid refined matter, the diſcharge is quicker and larger in proportion.

If the food be mixed with a redundancy of water, and be deſtitute of a proper quantity of ſalts to digeſt that water, the animal muſt ſuffer thereby.

I ſay digeſt, becauſe it is the ſalts that open the pores of the skin, or incloſure of the bowels, and alſo that of the bladder, and makes paſſages for the water to paſs therein.

For there is no viſible orifice for a diſcharge out of the bowels into any part of the body, from the mouth to the fundament, neither is there any paſſage by any viſſible orifice into the bladder, but through the neck, and this is purpoſely for a diſcharge or emptying the bladder, and not for taking in water, for it enters the bladder through the skin, by thoſe of an evaporating ſteam, and it is the ſalt particles (as I ſaid before) that divides and opens the skin of the bladder, and makes it porous, which gives admittance for the water.

But ſhould the water be of a poor thin quality, and deſtitute of a ſufficient quantity of ſalts to keep it alive and active till it enters the bladder, in ſuch caſe, it falls upon the liver in large drops, and not having ſalts thereamong to check it from doing harm, and being in a hot ſituation, it ſcalds (as it were) and wounds the liver under each drop of water, which ſoon turns to decay.

The point of the liver is generally firſt affected, and the reaſon is, becauſe it lies neareſt the maw, from whence this evaporating water proceeds; it is alſo of the coldeſt, deadeſt nature, being fartheſt from the heat of blood, which flows more rapidly in the blood veſſels, which are more large and plentifully placed in the thick part of the liver, and which are near the heart, therefore has a greater chance to reſiſt, or work off the wounding water, which it does, untill it comes in too great abundance for nature to withſtand, in ſuch caſe the ſheep cannot long ſurvive it.

The graſs that is impregnated with this poor unſpiritous water that rot the ſheep, as ſuch is grows in low ſwampy places, and which perhaps is forced up in one night's time; in wet and warm weather it ſprings up ſo rapidly (muſh-room like) that it has not time to collect the ſalts of the earth to bear a part in its compoſition, but conſiſts chiefly of the rain water that perhaps fell the night before, and (as I have obſerved in ſome other parts of this work) which had juſt undergone a rarefaction or dividing of the ſalts from the water in the firmament.

This frothy graſs may be known by a large drop of water ſtanding at the top of it, the ſheep eat the ſaid graſs greedily up, and with it ſwallow a great deal of the ſaid water, which being incloſed in the maw, heats and evaporates into a ſteam, and not having a ſufficiency of ſalts intermixed therewith to perform the office of digeſtion, by opening the different paſſages, as before hinted, likewiſe to keep the vapour or ſteam alive and active till it enters the bladder; but I ſay, for want of ſuch a proportionable quantity of ſalts, it falls upon the liver, and rots it as aforeſaid.

When my reader ſees, and conſidees the premiſes attentively, it cannot but appear very plain to him, that what I have ſaid is matter of fact.

That the rain water which has juſt undergone a rarifaction, or dividing of the ſalts therefrom in the firmament, deſcends and is taken up into the body of the ſheep, by the aforeſaid frothy graſs, and then falls upon the liver, and wounds it.

Admitting that this is the caſe, as it certainly is, a cure, or at leaſt a preventative, ſpeaks for itſelf, namely ſalt, this is what will certainly prevent the rot, if timely applied, without any aſſiſtance from other ingredients.

My method is, when I ſuſpect a rotting ſeaſon, to give my ſheep, each a ſpoonful of dry ſalt. This quantity is ſufficient to temper or mollify all the food that is taken in for one week, it mixes among the food in the maw, and evaporates among the watery particles through the body, and prevents it from wounding the liver, by giving it a quick paſſage into the bladder.

By this ſimple and cheap application, you take away the cauſe of rot, and the ſucceſs is not doubtful but certain, and by frequently uſing your ſheep to it, they will in time learn to lick the ſalt of themſelves, if you lay a little upon a flat ſtone in ſeveral parts of their paſture; they are by nature fond of it, therefore if you once get your flock accuſtomed to it, the trouble is over, and you need not fear having a rotten ſheep on any land, or in any ſort of weather.

When the ſheep has got the rot in the thick part of the liver there is no cure; but if it be not over far gone, there can be no better remedy than the receipt preſcribed in Vol. II. page 302.

The wormwood, rue, and balſam of ſulphur, together with ſalt, acts in a more forceable degree in purging the liver, when once ſeized or wounded by the water.

I have tried the ſpirits of turpentine, giving a ſpoonful to each ſheep, as has been adviſed by ſome authors, but did not find it to have that good effect as the above medicine, but as it is of a very penetrating healing nature, believe it might be of ſervice, was one ounce added to every quart of tea; this I have not tried, but am determined to try it the next time I have occaſion.

Let no man deſpair of ſucceſs from the above applications, as they have been proved both by reaſon and experience to be effectual.

Miſtake me not, I do not mean that they will cure all, though I am clear the ſalt will prevent all from rot if applied; for if the thick part of liver that is ſeated among the blood veſſels and near the heart, be once tainted, you may as well offer to bring the dead to life, as cure ſuch, tho' at the ſame time, thoſe which are not above half rotten may be prevented from going farther, and the liver as far as is rotten will knit, ſo that the ſheep will ſtand feeding the enſuing year.

I do not mean that the farmer can ſee into his ſheep which are curable and which are not; but by applying the medicine to all, if he ſave ſome he is well paid, ſince it is cheap and ſimple. I know that many poſſitive, bigoted people, who can judge no farther by reaſon than they can ſee with their eyes, will d—n me for a fool, for pretending to cure the rot in ſheep, a thing they think impoſſible, on ſuch my labour is loſt, and they have no advantage, becauſe their faith will not let them try the medicines.

Others may apply the medicine, and ſome of their flock may be too far gone for cure, therefore die; the farmer ſees this with his eyes, he knows he applied the medicine to theſe ſheep, he ſees them dead, and upon opening them, he finds them rotten.

Here again I ſuffer in his opinion, he d—ns me and my medicine, becauſe it did not perform miracles; the ſheep that live he immediately concludes were not rotten, ſo no thanks to his medicine for their cure, ſays he.

However I ſhall be more ſatisfied with his curſes, than with thoſe from him who will not try it at all, becauſe I may happen to have ſaved all the ſheep that live in his flock unknown to himſelf; therefore I ſay I am ſatisfied, ſince he is the gainer, and I am no worſe for his taunts, &c.

I ſpeak this knowingly, as I have many a time heard diſcourſe to the ſame effect, among a table full of them on a market day.

I once was preſent at a table in Lincolnſhire, where ſat about twenty-five farmers, moſt of whom lived near the ſea-ſide, where their ſheep went upon ſalt-marſhes.

There were ſome others that came out of the rotten ſheep country, and were then at a fair buying ſheep, to replace their ſtock, that were gone off by the rot.

So that the diſcourſe naturally turned upon the ſubject of rotten ſheep, with their cures, land, &c.

Here I heard various opinions on the ſubject.

It happened that there was one man in company who had ſaved his ſheep from the rot by my directions, in giving them ſalt, which he advanced as a truth, but it was looked upon as a chimerical ſtory by thoſe who came out of the rotten ſheep country, therefore led me deeply into the ſubject, to ſupport the cauſe; which to do it more forceably, I was obliged to preach a ſort of a lecture to the profit of the foregoing diſcourſe, by which I believe I made converts of all that heard me, and particularly when they came to compare corroborating circumſtances, in regard to ſalt marſhes never rotting ſheep and the like.

However, when I came to this part of my diſcourſe, a contradiction aroſe that had well nigh blaſted all my hopes; it came forth ſo well atteſted by one of the company; and this was, that ſheep did rot upon a ſalt marſh, for he himſelf loſt above half his flock one year by it; and that when the remainder were killed the year after, their livers had been touched, but were knit again; this was not only atteſted by himſelf, but by two or three of his neighbours.

This tale ſeemed to gain ground for ſometime, and I believe he himſelf thought it, but after many croſs examinations and queſtions, he remembered that he had (ſome time in the year they were rotten in) turned them into a fallow cloſe he had in another farm for about a fortnight, to eat the graſs before it was ploughed; but he concluded, that it was impoſſible for them to catch the rot there, they were in ſo ſmall a time, therefore thought nothing of it.

However in the end, inſtead of this tale making againſt my argument, it made for it, as it was evident they got the rot there, and might all have died had they not been taken out in time and put on to the ſalt-marſh, which knitted or cured thoſe that lived, being not ſo far gone as the reſt.

In ſhort, it was agreed by all the ſalt-marſh farmers preſent, that ſheep will not rot on a ſalt-marſh; that it is rather a remedy for the diſorder, if not too far gone.

Salt is a very wholeſome thing for

all ſorts of cattle, it not only keeps them cool and open in their bodies, by giving a quick and regular digeſtion to their food, but it is an antedote againſt grubs and worms, and alſo a prſervative againſt every diſorder or infection.

It would be well done of every farmer or ſtock-maſter to give their cattle a handful of dry ſalt every now and then, or to learn them to lick it off ſtones, which they ſoon will do with a little trouble, if placed up and down their paſtures.

CHAP. XVI.

On cabbage as food for cattle, &c.

THE next artificial winter-food for cattle to turnips is cabbage, and in clay or ſtrong lands, if well managed, perhaps it may be ſuperior to turnips, but a man may as well throw his crop away, as be a ſloven or nigardly in his management in any crop, particularly cabbage, as this crop above all others, will not bear bad management; the ground muſt not only be well tilled before it is tranſplanted, but it muſt be well hoed, and kept clean of weeds after.

It will be more profit for a farmer to only ſow half the crop, and manage it well, ſo as to have the ground all produce, then twice the quantity, on the other ſide of the queſtion, he will be much more a gainer, even if he had the land rent free, as the rent of the land is a trifle in regard to a good crop of cabbage.

I have known many experiments on this vegetable, and the worſt conducted one I ever ſee, proves it to be a piece of husbandry that by no means ought to be neglected; that every farmer ought to have more or leſs of it every year under cultivation.

I ſhall ſhew ſeveral experiments that prove it to leave a very large profit; but ſuppoſe it did not leave half the profit of the worſt crop I ever ſaw tried in feeding bullocks thereon, which is the faireſt way to prove its value, yet a farmer ought not to be without it, becauſe it is an excellent food to create milk; neither does it leave ſo rank a taſte in milk or butter as turnips; it is alſo excellent food for year-old calves.

By comparing my own experiments with every other experiment I have ſeen made upon this excellent vegetable, and drawing a medium therefrom, I find the following husbandry the beſt, moſt certain of a crop, and that of the moſt value, is as follows:

It appears from every experiment, that though any land will bring cabbages if well tilled, yet the crop always augments in value the richer the land is, and nearer it approaches to a loomy clay;

and tho' the ſtaple of the land be ſhallow by nature, it muſt be deepened by art, to bring it to a proper conſiſtence, for this crop is particularly fond of a deep ſoil.

Any ſort of ſtubble land may be winter fallowed for this crop, and the ſooner it is ploughed after the crop is off the better, for two reaſons.

Firſt, the ſtubble being turned under early, while it retains any of its ſap, the ſooner it rots, and is converted into manure.

Secondly, the land being early turned, reaps ſome advantage as a fallow, from the preſent ſummer, and the longer it is expoſed to the atmoſphere, the richer the ſalts will make it, as well as kill the roots of the weeds, when expoſed thereto.

So that for the above good reaſons, plough your ſtubble land before Michaelmas, and by the middle of November the ſtubble will be pretty rotten, then harrow it, and lie it up in two furrow ridges, in order to lie dry all winter, which by having ſo many out-ſides, and lying as it were in a heap, it mellows and enriches paſt conception.

This work is quickly performed, as only half the land is ploughed, for the plough goes and lies two furrows back to back, therefore about one half of the land is covered up with the other half.

Being thus in narrow ridges, it will be dry and ready for working any time in March.

Level the land by harrowing a-croſs, then plough it clean, and again the beginning of May, and alſo juſt before you tranſplant the cabbage, the beſt ſeaſon for which, is from about the middle to the 24th of June, however it is beſt to tranſplant at twice, that the crop may one part ſucceed another; in this caſe the firſt planting muſt be the latter end of

May, and the laſt about Midſummer; the former may be begun to be eat about Martinmas, and the latter will hold good till April, particularly if you ſow the long-ſided Scotch ſeed, which is abſolutely the beſt for cattle, as they are the hardeſt and of the greateſt produce.

The firſt favourable ſeaſon after the firſt of February, ſow your ſeed on a ſeed bed, either in the garden, or in ſome rich warm corner in a field, having a hedge to the eaſtward, to prevent the froſty winds from damaging the plants; half a pound of ſeed ſown will raiſe plants for ten acres of ground.

It is found from experience, the beſt method to tranſplant immediately from the ſeed bed into the field, without the expence or trouble of pricking out; the plants ſooner takes root, and fewer of them fails.

In taking them up it is beſt to lighten the ground with a dung fork, becauſe if they come hard by pulling, it hurts the fibres or veins between the leaves and the root, and ſometimes a plant will die, by over-ſtretching in this part, which if taken gently up it would not.

The approved diſtance by experience to place the plants from each other, are four feet between each row, and two feet between each plant in a row.

An acre at this rate will take 5445 cabbage plants. Two men and two boys will plant at this diſtance an acre on a day.

It would be ſwelling my work to a mere chit-chat were I to point out every ſort of manure that is proper for cabbage, for in ſhort they will improve and feed upon any ſort, and every farmer knows beſt what he can ſpare for the purpoſe, rotten midding muck or aſhes, they are particularly fond of.

The beſt method to lay on the manure in order to make it go far, and that the plants may reap immediate benefit from it, is to plough furrows four feet from each other, through the whole piece intended, then ſpread the manure in each furrow, after which go with the plough, and turn the ſame furrow back again upon the manure.

In this row ſet the plants, it will be a guide for the diblers to go by, and the roots will fall among the manure, and if damp, mill make them more immediately take root, and half the dung will be of more immediate uſe, than if ſpread promiſcuouſly over the ground.

In order to find proper diſtances more readily, take a gardening line, and at every two feet, put a bit of rag between the ſtrand; the man muſt run the ſetting ſtick cloſe down by each rag, and the boy which puts in the plants, muſt draw the mold about the roots, and ſet his feet at each ſide cloſe to the plant, to cloſe it firm.

I find that a man to make holes, and a perſon of low wages to put in the plants, will come more ſpeed than when each perſon makes holes, and ſets them himſelf.

There is no need of being at the expence of watering them, as they will bear a dry time better than any thing I know of.

As ſoon you ſee the weeds begin to grow, is the time to horſe and hand hoe, the firſt hoeing perhaps will be about the middle of July.

Many farmers who do not underſtand the method of horſe-hoeing, may think it a nice piece of work, and requires hoe-ploughs at great expence, &c. but there is no need of all this, the work may be performed very well and ſimply with a common plough; the beſt method is this, viz.

Go with the plough, and turn a furrow from each ſide of each row, cut as near the ſtalks as you can, ſo as not to damage the roots, by turning a furrow from each ſide; they meet back to back in the middle of the four feet intervals; then have a ſingle harrow made in the ſhape of a heart, the thick or wide end from corner to corner three feet; it muſt be drawn by the ſmall end twice backwards and forwards in each interval; this will pulveriſe the mold, and ſhake out the weeds; when harrowed let it lie two or three days in order to expoſe the weeds to the ſun to kill them; then go with the plough, and turn the ſame furrows to the ſtalks that you before turned from them, but plough deeper in order to raiſe the mold higher againſt the ſtalks; when you have turned theſe two furrows back to the ſtalks, you will find at leaſt two more in the middle of the interval, therefore you muſt continue till you have finiſhed, ploughing it all the ſame way.

One horſe-hoeing by this method is as good as two, by only ploughing a furrow againſt each row, as many do.

Two ſuch horſe-hoeings will keep your crop ſufficiently clean all ſummer; you muſt alſo hand-hoe between each plant, in the lengthway of the row.

A good acre will produce from fifty to ſixty tons of Scotch cabbage.

A large ox from eighty to a hundred ſtone weight, will eat about fifteen ſtone of cabbage, and half a ſtone of hay, in every twenty four hours. This will fat him in between four and five months; but to avoid fractions, we will only ſuppoſe an acre of fifty tons produce, to fatten four oxen, and each ox to leave five pounds profit between buying him in lean and ſelling him out fat. This leaves twenty pounds an acre to pay the expence, and for profit, as in the following table.

A Table ſhewing the expence and profit from an acre of cabbage eat by cattle.

To two chaldren of lime	0	18	0
To land rent	0	15	0
Four ploughings, and two harrowings	0	12	0
To planting	0	2	8
Two horſe-hoeings, and hand-hoeings	0	10	0
Hay for the four oxen, at times when they are on the cabbage	2	5	0
To intereſt for the money, ſuppoſe the four oxen coſt fifty pounds, half a year's intereſt is, at 5 per cent	1	5	0
Total expence	6	7	8
Which deduct from twenty pounds, leaves neat profit	13	12	4

PATENT OFFICE

This is a very conſiderable profit, one would think enough to encourage any farmer to cultivate this valuable crop; and yet as high as it may appear, it is far ſhort of what has been made by ſeveral ſpirited worthy gentlemen in Yorkſhire, which for ſeveral years paſt have been trying experiments in this crop, and with the greateſt ſucceſs too, to their honour be it ſpoke.

Charles Turner, Eſq; Chriſtopher Crow, Eſq; Simon Scroope, Eſq; E. M. Ellerker, Eſq; are deeply in it. Mr. Turner has ſeveral experiments which cleared him above twenty pounds a year from each acre. I wiſh ſuch like gentlemen as theſe were thicker ſown in England; ſuch ſpirited judicious experiments, might breed an emulation among farmers to follow their example, particularly if they would minute tneir proceedings, and make known their profits.

When cabbages are a good crop, a ſingle

cabbage, leaves included, will weigh from thirty to forty pounds, excluſive of the ſtalk.

I have now growing a new ſort of a green, it is of the broccoli kind, though I got it under the name of Jeruſalem cabbage; but I think the name wrong adapted, for it does not cabbage at all.

It is of a purple colour, has a large ſpreading leaf, the plant grows very high and vigorouſly, therefore will produce a great deal of food for cattle.

It is fond of clay ground, and has a very penetrating root, ſtrikes deep to ſearch for its food, inſomuch, that it is hard to pull up; it has ſcarce any ſtalk, but begins to branch out into leaves almoſt from the ſurface of the ground; it ſtands the winter well, therefore will be found of great utility for ſpring feeding, when other cabbage or green food grows ſcarce.

It is an excellent green for the table, and I think will be found very uſeful for cattle, particularly as it grows well upon poor clay ground.

I ſowed my ſeed this year in April, in a ſandy ſoil, the ground was trenched, it throve well, and produced fine plants; the ſeaſon was late this year, or ſhould have ſown it ſooner.

I tranſplanted them on to ſome ſtrong poor clay ground, which was trench-ploughed out of the ſod.

I gave it no ſort of manure, yet the plants flouriſh amain, and will doubtleſs be a good crop; but I propoſe to ſave them all for ſeed, as it will be a ſcarce article to get.

A gentleman in Suffolk gave me about half an ounce laſt year, from which I expect to raiſe ſeveral hundred weights, and ſhall diſpoſe of it as far as it will go to any gentleman ſubſcriber that may apply for it.

The worſt enemies that cabbage has are caterpillars; I have ſeen many acres deſtroyed by them; the method to kill them is to take ſome wet hay in a frying-pan, and mix among it brimſtone beat to powder, ſet this on fire, and go at the windward ſide of the crop, when there is very little wind, holding your hand low, ſo that you ſee the ſmoke go among the cabbages.

If you do this judiciouſly, it will effectually kill them; you may ſee them fall off and die immediately.

This is alſo a good way to fetch them from your fruit trees, and all ſorts of garden-ſtuff; I have made them tumble off like ſhowers of rain.

CHAP. XVII.

On the culture and perfection of turnip-cabbage, and other cabbages, as food for cattle.

THE turnip-cabbage is a ſpecies of cabbage, but differs greatly from it both in ſhape and taſte. I do not think it very agreeable to be eat with meat as greens, particularly to an Engliſh palate, who has ſuch variety of garden-ſtuff; however, it has one perfection peculiar to no other vegitable I ever ſaw, and that is, for bearing a great deal of hardſhip; for I eat ſome at a gentleman's table laſt May, that had been lying in the garden-walk all winter, which though not very palatable, yet was not diſagreeable: it was much better than I had taſted any when uſed at any other ſeaſon green from the root; it reduced to a ſoft pulp by boiling, and quite clear of ſtrings, or, what is called in turnips when they grow old, woody; this ſhews that it improves by keeping, and this too without care, in a hardy manner, which makes it the moſt valuable plant I know, for winter or ſpring feeding for cattle or ſheep. I ſay, in this it muſt be ſuperior to all others yet found out, in two or three caſes.

Firſt, becauſe it will laſt good till March, April, and May, when all other vegetables are ſcarce; and at a time too when ewes and cows (particularly) are wanting ſuch juicy food to create milk.

Secondly, the tops can be eaten in December, and the bottoms may be laid in a dry meadow till ſpring, where perhaps they may be as well or better, than if taking up houſe-room; and the land where they grew can be winter-fallowed, and got in good condition for a ſpring-crop.

Thirdly, they have a firmer texture than turnips, and lie longer in the cattle's bellies, therefore muſt be a ſtronger food to work upon for bullocks in the plough or the like.

Theſe are all conſiderations which plead greatly in their favour, and ought to make them greatly regarded by every farmer, ſo as to induce him to cultivate ſome, at leaſt, to ſupply the place of ſuch vegetables as will not laſt good till ſpring. It is a perennial, and a ſpecies of both the turnip and cabbage; its leaves are large and ſpreading, and greatly like thoſe of the winter-cabbage; the turnip part grows above ground, of an oblong ſhape, much like a Norfolk turnip that does not turn well; its colour is much like that of a cabbage-ſtalk, a paliſh green. It may be cultivated on good land to weigh 15 or 16 pounds; it ſeems to flouriſh much in a black, light, rich, boggy earth; for I planted a quantity in a reduced bog, where there was turf-graft five feet deep under it, and I had a fine promiſing crop; but my cattle broke in, and eat them all except a very few, of which one came to be above fifteen pounds weight. But the beſt crop I ever ſaw cultivated in the field for the food of cattle, was by Mr Baker, who acts under the patronage of the Dublin Society: indeed I believe he is the firſt that introduced them as a field-husbandry crop, and he makes ſome very ſenſible remarks thereon. He hints, that they would be very valuable as a vegetable, for ſailors in long ſea-voyages, and, in all likelihood, would prevent the ſcurvy: and, to appearance, I am pretty clear he is right, for ſince I have taken notice of this plant, I always find it better for keeping. It is not long ſince I boiled one that was eighteen months old and it was very good.

The world is greatly obliged to Mr. Baker for his uſeful hints. I have the pleaſure of being ſlightly acquainted with him, and think the world cannot value him enough for his candour, ingenuity, and indefatigable induſtry, in trying experiments on agriculture.

Mr. Baker ſowed his turnip-cabbage in drills, which crop produced about twenty ſix tons on an acre; but I am of opinion, that if they were tranſplanted in the diagonal form, with the tranſplanting machine, one upon every ſquare foot, an acre would produce above fifty tons weight, at a very moderate computation; but then the land muſt be well tilled, and if it be ploughed and harrowed immediately before the plants are ſet, there is no doubt but they will effectually keep down the weeds with once hand-hoeing in July.

The turnip-cabbage is managed in every degree as any other cabbage. The ſeed muſt be ſown the firſt of March on a ſeed-bed finely prepared. It is too much trouble and expence to prick the plants out for a large plantation, and they will do full as well by ſowing them thin on the ſeed-bed; and if you find they grow in lumps, then thin them by weeding, and prick out the ſuperfluous plants.

The middle of June is the beſt time to tranſplant them out; however, it is better to alter a week either way, to ſet them in, or before a ſhower of rain, if poſſible, rather than in a dry time.

Put them as deep in the ground as the leaves will admit, and cloſe the ground well about them.

If you ſet them in the diagonal form, you may draw a little earth about the ſtems with a hand-hoe, about the beginning of Auguſt.

This cabbage does not take up more ground to grow on, than the common turnip, therefore need not be hoed to a greater diſtance.

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CHAP. XVIII.

On ſix rowed barley.

THIS is a ſpecies of barley that is very ſcarce in England, neither do I know where it originally came from.

I by great expence and trouble procured four ears, which produced two hundred and eighty grains, which I ſowed on a piece of leay ground, that was trenched without manure: the fifteenth of April laſt I dibled it in, twelve inches between the holes, and three grains in every hole.

When I got the ſaid four ears they were very green, and by keeping them long in my pocket, the grain ſhrivelled up to be very ſmall, ſo that I was afraid they would not grow; being very dry, I ſteeped them in my pickle twenty-four hours, then, as directed in this work, I candyed or coated them over very well with the compound manure, and I believe every grain grew. Field mice would ſcratch to the grain, but leave it there.

Thus far it eſcaped from waſte, grew up and flouriſhed greatly; each grain ſtooled or branched out from twenty to fifty ears; but juſt as it was ſhooting into ear, I had a mare tethered in the ſame, which broke looſe, and cropped every root, which vexed me more than if the mare had died, which coſt me thirty pounds, becauſe I did not know where to get as much more, were I to give an hundred pounds for it; however, contrary to my expectation a great deal of it ſhot out and grew a ſecond time, but the forwardeſt ears which were ſhot, grew no more, therefore I computed, that about one half of my crop was loſt by this miſchance.

When it got into ear, what with people going to ſee it, and plucking it, and birds and mice feeding upon it, I loſt a great deal more. This obliged me to ſhear it before half ripe, or I found I ſhould have little left; notwithſtanding all this, I really believe I have two thouſand fold for every grain I ſowed. I have as much as will ſow an acre, by the ſame method that I took laſt year.

In ſhort it is of the greateſt produce of any grain I ever ſaw: I promiſe myſelf a great deal of ſatisfaction from it, and as ſoon as I have any to diſpoſe of, ſuch of my ſubſcribers as chuſe to apply, ſhall be firſt ſerved.

The ear conſiſts of ſix regular rows, the grain is cloſe ſet; each row contains from ten to ſixteen grains, but moſtly fourteen.

The grain is as bold, ſhort, plump, and thin ſkinned, as the two rowed ſprat-barley.

The beſt account I could get of this barley, after riding above two hundred miles in purſuit of it, was from an old clergyman in Kent

Says he, about twenty-five years ago, being curious and fond of farming, I by chance heard of this barley, and procured a ſmall quantity, which brought me quickly into ſtock. I ſowed it on a ſtrong cold land, and had a great return, above double the quantity on an acre, that I had from other barley ſown on the ſame ſort of land, and with the ſame ſort of tillage or management.

It is not nice in its choice, but will grow almoſt on any ſort of land, and is ſo generous as to give a good return.

When I gave over farming about twenty years ago, I ſold my crops on the ground, a good deal conſiſted of this ſort of barley; the farmer ſent it to the malt-houſe, therefore the ſeed was loſt, none being ſown ſince to my knowledge.

This is all the ſatisfactory account I

could get. I went by this gentleman's direction to the farm where the barley formerly grew, but the ſeed was intirely loſt, as no farmers in the neighbourhood had any remains of it, though moſt of them had heard of it, yet their ideas were ſo confuſed, that I could get no further ſatisfaction than that the clergyman gave me.

CHAP. XIX.

Shewing how cattle lies on fat, lean, &c.

IT is not the quantity, but the quality of food, that the beaſt takes in, which is of efficacy enough to ſuſtain the appetite from hunger, that gives life and vigour to the animal ſpirits, and which lies on fat and lean.

It ſignifies nothing if a beaſt eat ten ſtone of hay, if that quantity contain no more ſpirits or oily qualities, than what might be expected in one.

Such a bulk only ſerves to paſs through the bowels, and augment the dung-hill, without adding to the fat or ſubſtance of the carcaſs.

The heat of the body in all animals performs the office (as it were) of a refiner's ſurnace. The food when taken in at the mouth, is a mixture of dead matter, ſome abounding with a greater quantity of rich oily ſpirits than others do.

The food being entered into the maw, a place by nature deſigned for a repoſitory, where it is to lie on a heap till it begins to heat or ferment; this is its firſt ſtage.

The next is a putrefaction, which divides and thins the groſs matter by degrees, and it diſperſes it into narrower paſſages; then it undergoes a greater degree of heat which farther thins it all into a fluid matter, ſo as it can eaſily teem into the ſmall bowels, and while in this ſituation and liquid ſtate, the heat is ſo extremely great, that it brings on a compleat rarefaction, and the thin, rich, ſpirity vapours thereof, penetrate through the skin of the bowels, and riſes in a ſteam like the ſmoak of a tallow candle, to the different parts of the body where nature deſigned it.

Not but but there is in ſome degree a diſcharge of this rich matter through the incloſure of the bowels, in paſſing all the ſtages from the maw to the extreme part; but that which is moſt compleat, is, while in the fluid ſtate in the ſmall intrails.

When it has undergone this rarefaction, the dry, barren, groſs particles, begin again to unite and grow drier and drier, till it is diſcharged as dung.

There is another obſervation which I

ought to make, which is, that no animal before it comes at the meridian of age, or growth deſigned by nature, will feed or lie on any quantity of tallow or fat.

The reaſon is, becauſe the ſinews, fleſh, and bones, are open and porous, which admits the oily fluids to enter thereamong, by which they are inlarged, and which takes up ſo much of the oily ſpirits, that there cannot be a ſufficiency to lie on fat too; but when the creature comes at its proper age and growth, the bones, &c. are grown to a very firm texture; the grain or ſurface thereof are cloſe, hard, and callous, and ſo conſequently reſiſts the evaporating oily fluids from entering therein; in ſuch caſe they cling together about the inner ſurface of the body, ſuch as the kidneys, kell, &c. juſt as if we were to burn a great deal of tallow in a cloſe room, for want of vent the room or walls thereof would quickly be covered over with ſoot, which is no other than the tallow itſelf, only that it has undergone a change in the nature of its colour.

I can ſcarce mention this, without bringing on another piece of natural philoſophy, which is rather foreign to the ſubject, however ſince I am ſo far, fewer words may ſerve.

The colour in moſt caſes ariſes from friction, which alſo begets heat; if the heat be raiſed to a great degree the colour is red.

Blood is the hotteſt fluid in the body, and alſo the redeſt, and it undergoes the greateſt friction of any other fluid in the body, on account of the quick and teeming motion through the veins and arteries; and when any creature is more than commonly agitated in the motion of the body, the blood runs quicker, the friction thins it, and it is ſtill of a livelier red.

On the contrary, if the creature be cold or dull by nature, ſo as to be ſlow in motion, or if the animal frame be out of order by catching cold or the like, the fluids are in ſuch caſe all deadened and ſlow in their motion, inſomuch that the tallow or fat will be changed in colour, from a white to a darkiſh grey-caſt, and the blood inſtead of a florid red, will be almoſt black, becauſe the friction is ſlow, the animal ſpirits are thick, heavy, and languid, and the heat in the body abates in proportion.

All this proves that theſe colours are cauſed by heat and friction; it is eaſy to make water white by friction, and to raiſe it into a degree of heat too, by beating it about with a whisk, which raiſes a froth, and that froth is white.

Snow is no more than water raiſed into a froth by friction, or being toſſed about in the firmament, and while in that frothy ſtate, it is hotter than common; then ſuddenly comes a cold eaſterly wind which congeals or binds up the particles, and conveys it into our region in that white frothy ſtate as ſnow.

When any animal grows old, its blood and fluid matter abates in its motion, and as age creeps on, it yet abates more and more, they run cold, ſlow and languid, therefore the heat through the body abates in proportion, till it comes ſo low as not to have ſufficiency enough to cauſe a rarefaction, or ſeparation of particles, to ſupply the animal ſpirits.

Inſtead of that, the food is diſcharged through the body, before it is (what is vulgarly called) well digeſted, becauſe the body has not in it a ſufficient heat to cauſe the ſaid rarefaction.

Moſt creatures when they grow old, or are cold in conſtitution, has generally a large belly, and ſo has ſuch as live upon unwholeſome or poor ſpiritleſs food.

I hinted in the beginning of this chapter, that it was not the quantity of food, but quality of, which ſatisfies the cravings of appetite; ſo it is, for we generally ſay, when any thing is rich and luſcious, that it is cloying to the appetite, that much bulk cannot be eat, &c.

The reaſon is, becauſe the abundance of rich oily ſpirits it contains, evaporates into the body, and ſatisfies the cravings of nature, though the bowels be left almoſt empty; cattle which live on ſuch rich food, have generally ſmall bellies.

On the other hand, cattle have large bellies, from ſeveral cauſes.

Firſt, from the food being barren of richneſs enough to ſatisfy the appetite, by evaporated matter as aforeſaid; therefore the creatures are ſpurred on (as it were) by the cravings of appetite to eat a great deal, till they ſwell the belly, and ſtretch the ſkin to a great ſize, in order that out of abundance of groſs matter they may diſtil the more refined matter to ſatisfy their cravings, for nature always ſpeaks for itſelf.

Secondly, as a beaſt drops into years, the ſize of the belly increaſes, becauſe the conſtitution grows colder; for when fruit is full ripe, it will not ſtay long in that period, but will naturally decay.

Every animal is either going up or down the hill of life; when going down, the blood abates its former rapid motion, the friction in the veins and arteries are not ſufficient to keep the fluids hot, ſo that the interior parts of the whole machine abates of its uſual heat, not having ſufficient to diſtil, ſeparate, or rarefy, the rich oily particles from the groſſer matter. The cravings of the appetite ſpurs the creature on to eat, till the belly is enlarged beyond its uſual bounds, for the hunger is allayed from a ſufficiency of theſe rich evaporating qualities, and not from a great belly full of dry barren matter.

In like manner, when a creature by

any accident has got a cold that the air has imbibed through the exterior parts, and got impregnated among the fluids, the blood is thickened and cooled therewith, ſo that the heat of the body is not ſufficient to perform its uſual office of a compleat ſeparation of particles; and tho' the creature may eat a great deal, yet the food will go through it without performing its office of fattening and ſtrenghthening the body.

Farmers generally call ſuch like cattle ill-thriven creatures, they put their meat (ſay they) into an ill skin, for it does them no good, and ſuch like ſtuff, not conſidering from whence it ariſes.

Cattle in ſuch a habit of body, may not be abſolutely ſick, will ſubſiſt a long time, though not be of much benefit to the owner, till the cauſe is removed, which ought to be by hot nouriſhing drinks, and be kept on ſuch food as are rich and eaſy of digeſtion.

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CHAP. XX.

On feeding cattle, &c. Shewing a cheap food for laying on tallow, never before made public.

IF my reader has looked over the foregoing chapter, he will the ſooner perceive which ſort of food will expedite the feeding of his cattle quickeſt and cheapeſt, a conſideration every one ought to bear in mind.

The quickeſt feeding a beaſt can take, is linſeed oil and bran mixed.

If the cattle be but ſmall, give each two pecks of bran a day, divided into three feeds, which will ſerve morning, noon, and night, into each peck put half a pint of linſeed oil, mix it well.

The cattle will eat it very greedily, and it feeds them paſt conception; they muſt have what hay they will eat, but that will not be much.

The oil dilutes all the reſt of the food they eat, and as to itſelf it all ſtays in the beaſt as fat.

Five gallons of oil, which will only coſt about ſeventeen ſhillings and ſix-pence, and the bran in proportion, will fatten a beaſt ſooner and more effectually than five pounds expended in any other food whatever.

It is well known in Wisbich, that a gentleman of the faculty in ſaid town, fed a ſmall beaſt with this food, which produced twenty ſtone five pounds of tallow, and the four quarters only weighed thirty three ſtone; ſuch a weight of tallow in ſo ſmall a beaſt was prodigiouſly amazing; I have known it in a manner perform wonders with my cattle in fattening them very quick; but nothing equal to this I have as yet to boaſt of.

Another method I take is to mix two buſhels of bran to one buſhel of malt cums, and one buſhel of peaſe meal; when all are mixed well together, and laid in a heap ready for uſe, give each beaſt a peck at a feed every night and morning, with half a pint of linſeed oil mixed in each feed juſt before you give it.

Moſt ſtock-maſters know that linſeed cakes from the oil mills are good feed for cattle, yet it is nothing equal in value to the aforeſaid food, becauſe there is a richneſs in the bran, &c. far ſuperior to the husks of the linſeed; for when the oil is all extracted the husks are of no uſe.

Such cattle as are fed upon theſe cakes can be ſaid to feed upon nothing but oil, which they contain, and which the mill could not extract.

But admitting that cakes were as good food as oil and bran, (which they are not) yet the food cannot be general, it can only be practiſed in a very few places, near oil-mills, as it is of too heavy and bulky a nature to admit of far land carriage, whereas the oil, bran, &c. can be procured all over the kingdom.

After what has been ſaid, it appears plain, that every ſort of food is of value, according to the quantity of oily rich ſpirits it contains; therefore would adviſe every ſtock-maſter or farmer to pay due regard thereto, by providing food of the richeſt kind, for either his cattle or horſes, particularly for ſuch as he intends to feed; if the food be good, leſs will ſerve, and the cattle will be handſomer in ſhape, and their bellies will be ſmaller; a large one looks very diſagreeable either in the horſe or cow kind, and it is chiefly the poorneſs of the food which cauſes it.

Keep a horſe on hay alone, and he will have a great belly, but give the ſame horſe a proper quantity of corn, and it ſhall reduce it to a moderate ſize. If this was not the caſe, hunters and running horſes would have as big bellies as other cattle, but it is rich feeding which keeps them in proper ſhape.

The ſame obſervations alſo hold good to graſs-land; therefore when a farmer wants to take a piece of ground he ſhould take notice what condition the cattle are in that goes thereon, if their hair be long rough and ſtickling, and their bellies large, he may reaſonably conclude the land to be poor and ſpiritleſs, the graſs it throws up to be deſtitute of oils or richneſs, ſufficient to ſatisfy the cravings of appetite, without taking in a great deal of groſs matter for that purpoſe.

On the other hand, if the cattle upon the land be ſleek and ſhining, the hair ſhort and lie cloſe, and the belly round and ſmall almoſt like that of a running horſe, all theſe are plain and ſure tokens, that the ground on which they go is good, the graſs rich and oily, which evaporates, penetrates, and inriches all the fluids of the body, keeps them thin, hot, and lively, ſo conſequently the body in health and vigour.

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CHAP. XXI.

On ditching, planting quicks, &c.

IT is very ſtrange, that conſidering ſo much incloſing, and land improvements as are going on in England, that the proprietors thereof ſhould be ſuch great novices in making fences for that purpoſe; in ſhort they go to great expence to create yet more both expence and labour.

The Iriſh gentlemen has much the advantage of the Engliſh in this point of improvement. When they make a fence is is almoſt everlaſting, and yet not half ſo expenſive. I have heard ſome Iriſh gentlemen who had travelled through

England) ſay, that they ſcarce ever ſaw a good fence there.

This may be going a little too far, as the grown up quicks may be a good fence; but however this I can ſay, that there is not a piece of new fence in England (that I ever ſaw) to compare with what is generally made in Ireland, tho' much more expenſive.

The general method in England, is to incloſe with poſts and rails; they ſet two rows, one at each ſide, the quicks at about ten or twelve feet aſunder, and the quicks placed in the middle.

They make a ſmall drain at one ſide, perhaps three feet wide, and two deep, lying the ſods up to the firſt or bottom rail, at the outſide of the incloſed part, commonly called the fence ſide.

Before they ſet the quicks, they turn up a ſod a ſpade graft deep, and perhaps two feet broad, in this they plant the quickſets, placing them upright, each ſet three or four inches aſunder.

This is the Engliſh method of incloſing, and a very expenſive one it is, as the poſts and rails come very high, even in the cheapeſt part of the kingdom, where wood is moſt plentiful. I know ſome parts where this method of fencing coſts five ſhillings a perch at leaſt, the firſt expence; and if the quicks be done juſtice to, the expence of weeding is great, as they have no advantage over the graſs and weeds, but grow promiſcuouſly all together, therefore ought to be weeded two or three times in a year; and if it happen to be in an open country, where ſhelter is ſcarce, and which is generally the caſe upon all new incloſures, the quicks are expoſed to the inclemency of the weather from all quarters.

The eaſt and north-eaſt winds moſtly, which bring a bliting froſt along with them, wounds the tender leading buds of the quicks, and makes them grow runtiſh, cankered, and dwarfy; this is the greateſt misfortune that either quicks or any other foreſt trees fall under. It matters not how bad the land is, ſo as the tender plant be kept warm and dry while young.

I follow the Iriſh method of making fences. Inſtead of poſt and rails I throw up a ditch (if in ſandy land which is apt to run) nine feet wide and eight deep; but in ſtrong, wet, clay land, where the banks will ſtand with a leſs ſlope, I make them only eight feet wide at the top, and eight feet deep; but in any ſort of ground, the ſides of the ditch muſt be ſloped till the bottom is only the breadth of a ſpade wide, for the conveniency of ſhoveling out the laſt looſe earth.

The narrower any drain is at the bottom and better, becauſe the water is gathered more to a-head, by which the current or motion of the water is kept quick, which prevents the graſs from growing, and alſo the cattle from walking therein.

A bank muſt be made with the earth that comes out of the ditch, ſtill keeping the ſame ſlope to the top thereof.

It is the Engliſh method in making a bank to cut the ſods ſo as to fit one another, and make the face of the bank with the graſs ſide outwards; this is a bad way, for when the graſs grows, it encourages the cattle to climb up with their fore feet to eat it, which breaks the foundation, and then the top ſoon follows.

To avoid this, as well as to prevent the graſs, weeds, &c. from choaking any quicks, trees, or the like, that may grow in the hedge, we ought to take every precaution, not to let ſuch enemies take root in the bank; therefore inſtead of lying the graſs ſide outwards, the beſt method is to bury the ſods in the heart of the bank, and lay the ſecond ſpit or dead earth, which comes from the bottom of the ditch, and which has no roots in it, on the face of the bank.

The bank muſt take its footing three inches within the back of the ditch, on this kind of a ledge or ſhelf. You muſt lie the firſt row of quicks flat on a ſide, with the tops outwards, hanging over the ditch; you muſt cover the roots up with dead earth, and which is the foundation of the bank; but before you lie the quicks, turn the ſod they lie upon the graſs ſide downwards to prevent its growing.

It is better to have two rows of quicks, though the ſets be no more in number than what might be in one. Suppoſe you would have the ſets to be three inches aſunder in one row, in this caſe lie each ſet in the firſt row ſix inches aſunder; then cover them over three inches thick with mold, then lie upon it another row, ſix inches between each ſet; obſerving that each ſet in the top row fall even in the middle, between each ſet in the bottom row; in this caſe each quick in the bottom row grows up in the center between each quick in the top row, and the roots not being crowded, but having more mold between them, flouriſh better.

This method has four times the advantage of the common Engliſh method, even in quicks growing.

Firſt, as the quicks lay flat on a ſide, the ſhoots ſtrike out cloſe to the root, and to the ſurface of the earth, and alſo throws out more of them; therefore the hedges will never be naked or open at the bottom, as when they are planted upright.

Secondly, the ſods being ſmothered in the body of the bank, rots and turns to manure for the quicks to feed on, which will make them flouriſh amain.

Thirdly, the bank being all made on dead mold, has no roots in it to throw up graſs, weeds, or the like, to choak or retard the growth of the quicks, therefore will want little trouble in weeding, and before they get footing, the quicks will get out of their reach.

Fourthly, the bank, which is ſix or ſeven feet high, is a good ſhelter to keep them warm, and which will make them flouriſh ſurprizingly, particularly if it be made to the eaſtward of them, ſo as to fence off the cold winds, which muſt always be the caſe, if it be poſſible that the nature of your incloſure will admit of it, and this can always be done in any inner parts of a domain, ſo that there is only one fourth part of a ring fence that need be expoſed thereto.

The ditch of itſelf is, at firſt making, a better fence than rails, and it will mantain itſelf for many years. The poor hedge-breakers cannot carry it home to burn, the hunters can do it little hurt by by their leaps, and the cattle cannot come at the quick to crop it, till it is old enough to value them not.

The bank alſo is an immediate ſhelter for cattle to lie under.

The back of the bank muſt be carried up ſloping, and with a ſharp edge at top ſo as a beaſt cannot ſtand thereon. The back of the bank may be ſown with graſs-ſeeds, ſo that the cattle may graze as far as they can reach.

In ſix or eight years, when the quicks are large enough, the bank may be ſet with potatoes, and being well dunged for the crop, they will mellow and enrich the earth, and when they are taken out, you may plough the bank down, and mix therewith a layer of lime, and another of ſalt, &c. which will make a good heap of compoſt to lie on your meadow or other graſs ground, for a trifling expence.

All the foregoing advantages muſt appear in favour of this method of fencing; but yet there remains another prevailing argument, which is the ſaving of expence, for a ſeven and eight feet ditch may be made, the quicks ſet, the back of the bank ſloped up, and all compleatly finiſhed for twenty-pence a perch in any part of England, and in ſome places, and in ſome ſorts of ground, for much leſs.

In ſhort I know the difference of the value ſo well, that I would not take a hundred pounds in hand, for what I have to do, to be obliged to follow the preſent Engliſh method of incloſing, and fence-making, in preference to this.

CHAP. XXII.

On planting in general foreſt trees of all ſorts.

THE improver is to conſider planting in two different lights, one for pleaſure, and the other for profit; but if he have a taſte and judgment, he may join them both together, and fetch profit out of pleaſure.

What we mean by pleaſure, is by judiciouſly tranſplanting a mixture of various ſorts of trees in a diverſity of ſhapes, ſuch as ſerpentine walks, clumps, groves, hedge-rows, &c. ſome to come early into bloſſom, or leaf, and others late, ſome of one colour, and ſome of another. When a wood, grove, or hedge-row, are thus variegated with various objects of colour and ſhape, it gives delight to the eye and pleaſure to the mind, but doubly ſo to thoſe who have a contemplative turn to muſeupon the works of nature. What can be more delightful, or even heavenly, then for a perſon of buſineſs to retire from the cares of the buſy world a few hours into a well planted grove? there every object he ſees invites him to contemplate upon the works of his creator. The feathered creation alſo are warbling out their various notes, in their maker's praiſe, and telling man (the favourite work of GOD) that they were all created for his pleaſure. A poet might well in raptures break out as in the following lines:

My God I love, and I adore!
But ſouls that love would know thee
more,
Whilſt I for ever hide and ſtand
Behind the labour of thy hand;
Thy hand unſeen ſuſtains the poles
On which this huge creation rolls!
Thy ſtarrey arch proclaims thy power,
Thy pencil glows in every flower,
In thouſand ſhapes and colours riſe
Thy painted wonders to our eyes;
While beaſts and birds, with lab'ring
throats,
Teach us a God in thouſand notes.
The meaneſt pin in nature's frame,
Marks out ſome letter of thy name.
Where ſenſe can reach, or fancy rove,
From hill to hill, from field to grove,
Acroſs the waves, around the sky,
There is not a ſpot deep or high,
Where the Creator has not trod,
And left the footſteps of a God.

If a planter wiſh for both profit and pleaſure, he muſt plant a mixture of ſeveral ſorts of trees, and place them in ſuch a manner as neither to intercept his view, nor take up his ground from producing their ordinary courſe of crops, and at the ſame time be agreeable objects to attract the eye, and enrich his pocket.

The fancy of man in plantations, (as in moſt other things) has changed much within theſe few years laſt paſt.

The taſte was formerly to plant all in long cloſe rows, at each ſide of an avenue, or in hedge-rows or woods, but the method is now to plant in round, ſquare, or angler clumps, in different parts of a domain, at a diſtance from the manſion houſe, and alſo to plant odd trees in a ſcattered manner up and down lawns and meadows near the houſe, ſo as not to obſtruct any proſpect, and yet to make the part look warm and ſhelterly.

This taſte is extremely agreeable to the eye, and alſo profitable, becauſe the trees are augmenting in ſize, by feeding under-ground, and at the ſame time the ſurface is producing any crop the owner pleaſes, particularly if he makes choice of ſuch trees as feed deepeſt in the earth.

In this caſe I would have him to guard moſt againſt aſh, being a tree though very uſeful and profitable, yet a great impoveriſher of the corn mold, as it feeds near the ſurface of the earth; neither is it a tree for beauty, as it comes the lateſt into leaf or ſeaſon, and goes the ſooneſt out; it ſhould be planted by the ſides of high-roads, commons, or ſuch like waſte grounds.

The oak is the beſt tree that can be planted in a lawn, meadow, or ploughed ground, becauſe it feeds deep, therefore does not impoveriſh the ſurface; and if in ground that is under tillage, the plough can (without obſtruction) go near the trunk.

The ſmall leafed elm is an excellent timber, alſo a quick grower, and a profitable tree; it ought to be planted in hedge-rows, as it will bear planting cloſer together than any other tree. It has an aſpiring head, and grows beſt when the boughs are loped off near the trunk, in this caſe it does little damage to any underwood that may be under it.

The following are a liſt of trees that are proper to be planted intermixedly in lawns, meadows, or pleaſure grounds, viz. oak, Engliſh-elm, beech, Scotch-fir, ſpruce-fir, ſilver-fir, New-England pine, horſe-cheſnuts, walnut, poplar, ſycamore, larche, black-cherry, apple, and white thorn tree.

Theſe being properly mixed, will give a diverſity of colours and ſhapes, very agreeable to the ſpectator, and every one be uſeful in their turn.

In order to imitate nature as near as poſſible, they ſhould be placed very irregular, and likewiſe ſo thin, as not to obſtruct any proſpect, except ſuch as are diſagreeable, as a rock, a barren bit of land, or a marle-pit, quarry, or the like, all ſuch as theſe ſhould have a clump planted before them, to obſtruct the eye from ſeeing them.

As to all diſtant monuments, valleys, woods, rivers, fiſh-ponds, towns, churches, caſtles, antique buildings, &c. are agreeable objects, and ought not to be obſtructed from the eye by any home plantation.

As to the method and time of planting it varies much, ſome will recommend Michaelmas planting for foreſt trees, and others the ſpring.

Trees planted in either may do well, but I find by experience that the beſt time is when the ſap is riſing, viz. from the beginning of March to the end of May.

The month of May is as good a time as any in the year, to plant evergreens in, ſuch as fir, larch, &c. In ſhort I have ſeen elm-trees thirty feet high removed at Midſummer, which all throve very well; they were removed and inſured by a very ingenious, experienced gardener; he was to receive two ſhillings a piece for every tree that lived, but was to forfeit a guinea for every one that died; and he told me, that he found by experience, that it was ſafer to remove trees in ſummer than winter, provided they were not long out of the ground, and a ball of earth taken with the root, and well watered for two or three days at firſt, till they take root.

The beſt way of planting them is not to dig a hole as is uſual, but to ſet them upon the top of the ground, and dig a grip round each tree, at about three feet diſtance, and with the earth that comes out you muſt cover up the roots, which will form a little bank or hill round the tree root; but before you ſet the tree upon the ſurface, you muſt turn the ſod (it is to ſtand on) the graſs ſide downwards, then the roots will ſtand upon the freſh mold.

This is not only an eaſy method, but a very good one, becauſe the roots feed among the corn mold, when the ſod rots it turns to manure about the roots, and encourages the growth greatly. If the land be ever ſo poor in nature, they will flouriſh amain.

Being planted, the next care is to fence them from cattle; if they be either cropped or rubbed againſt it retards their growth, and makes them runtiſh. In ſhort, a man had better never plant, as not fence from cattle.

But as the expence and trouble of fencing retards many a one from planting, I ſhall point out an eaſy cheap method, to keep the cattle from the trees.

When trees are planted in open paſtures, the uſual method is to ſet three ſtakes round the tree, in a triangular form, and nail trhee ſticks on the tops of them, then faſten thorns therein.

The beſt method is to avoid all this trouble, and do no more than to tie two bunches of whins (ſo far as the cattle can reach) round the trunk of the tree, with a thumb rope made of hay or ſtraw, after which daub a little cow dung over each rope, which will prevent them from eating it. If whins be not to be had, ſmall ſharp thorns will anſwer the end, but cut off all thick ends, for if ſuch preſs hard againſt the bark of the tree it may be hurt therewith.

This is a very cheap ſimple method, and anſwers the end better than poſts or rails ſet round, particularly for all trees that are ſix feet high and upwards; and indeed none of a leſs ſize ought to be tranſplanted out of the nurſery, particularly into lawns, meadows, and ſuch like open places where cattle comes. In fencing the trees thus, take care not to put on over much whins or thorns, five or ſix pounds weight, if properly placed, with the prickly ends outwards, will anſwer the end as well as ever ſo much.

When moſt ſorts of foreſt trees are planted, the ſide branches ought to be lopped off, but the top branch which is called the leader, muſt be carefully preſerved from any hurt, for when this is gone the tree is not worth much. If wind, froſt, or any accident, wound or break a leader of a tree, it is the beſt way immediately to root it up, and replace it with another, as the expence of a tree is a trifle, in compariſon of loſing two or three years growth, and the beauty of the tree alſo.

Oaks will bear this miſchance better than any others, but as to elm, fir, or larches, if the leader be gone, they are not worth a farthing. The lime-tree is generally planted more for beauty than profit; therefore by cutting its top off, it rather adds to its beauty, though indeed not to the value of the timber.

A great many planters, thinking to do the work more effectually, prop their new planted trees with ſtakes drove into the ground at each ſide, but this I think rather does more hurt than good, as from all the obſervations I have made, I ſee more crooked trees growing from this method, then when left to chance; and the thing accounts for itſelf, for one cannot drive a ſtake down ſo faſt, but one windy day will work it looſe, having only one leg to ſtand on; and when once looſe it does hurt, becauſe the tree has the weight of the ſtake to bear, and in a high wind the tree and ſtake gives way together, and when a tree bends from the wind, the ſtake acts as a prop to keep it in that poſition, as the ſtake has not any

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balance, ſpring, or elaſtic cauſe, to bring it back again.

Whereas, if the tree was left to itſelf, as it ſtands on a broad bottom, the roots act as ſhrouds, or ſtays round it; the earth laying thereon is a balance to bring the tree back again after it has been bended from the blaſt.

Beſides, except very great care be taken, the continual waving and motion of the tree, wears any fence or lapping put between the ſtake and it, and admits the ſtake to rub againſt it, and wound the bark thereof; in this caſe I need not tell the damage, every one knows it.

So that upon the whole, it is much better to ſet the tree firm, by treading the earth about it well, and then leave it to chance, than prop it up though the tree be ever ſo tall.

As to ſoil proper for trees, I need ſay little about, as few people in thoſe days but what knows that very well; particularly ſuch as raiſe nurſery, either for their own uſe or for public ſale.

Beſides were I to make a plantation on a piece of land, let it be of what ſort it would, I would plant every ſort of foreſt trees thereon intermixedly, only with this difference, that if the ſoil was ſand, I would plant the greateſt quantity of of fir or larch thereon, and if a ſtrong clay, the greateſt quantity of oak.

As to the wetneſs of the ſoil, this is immediately provided againſt by my method of ſetting the tree upon the ſurface, and making a grip round it; this puts low wet ground nearly upon the balance of that which is of a drier nature, and whoever tries it will immediately find the good effect thereof.

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CHAP. XXIII.

How to make a nurſery, &c.

AS I would be as conciſe as poſſible, without being thought tedious in relating things which are generally known, I ſhall therefore in a few words ſhew the beſt method of making a nurſery of foreſt trees, on ſuch ſeeds as may eaſily be procured in the country by any country gentleman or farmer.

When you have fixed on the ground for a nurſery, as this is ſeldom of a large extent, I would by all means adviſe trenching it with ſpades, at leaſt two ſpit deep, burying the upper ſpit, wherein are all the roots of graſs, weeds, &c. at the bottom; this will prevent a multitude of trouble that generally attends keeping nurſeriesclear from weeds, graſs, and ſuch like real enemies to young plants.

The ground being thus trenched and

levelled with a harrow or garden rake, your next ſtep is, then to determine upon as many ſorts of ſeeds as you would ſow, and make ſo many diviſions out, by either ſtakes or bits of bows.

After this ſow your ſeeds as intended, upon each diviſion, then lie out each diviſion in beds nine feet broad, and ſtretch a garden line at each ſide to guide you ſtraight; make a ſmall furrow about a foot broad, and half a foot deep, and with the mold that comes thereout ſpread over the ridge to cover the ſeed, which will be about one inch thick, and which is a ſufficient covering for any ſort of ſeed.

By this method (which is performed with little trouble, being nothing but a ſhovelling of looſe mold to ſpread over the bed) you ſave a great deal of ſeed to what you would do by harrowing or raking in, becauſe in this caſe, all the ſeed is covered at an equal depth, ſo will come up more even altogether, and none of it lies expoſed to the fowls of the air, but if harrowed the pines let ſome in very deep, whilſt others lie above ground for the birds to carry off.

A very little ground for a ſeed-bed will raiſe a great number of plants; but at two, or at moſt three years old, the plants ſhould be pricked out into another nurſery, prepared by trenching as the ſeed beds were. If ſet in rows at eighteen inches aſunder between each row, and one foot in the row diſtant from each other, they will ſtand very well to be eight or ten feet high, before they need to be tranſplanted out for good and all. They grow up ſtraighter, and has cleaner trunks, for being cloſe together in the ſecond nurſery.

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CHAP. XXIV.

How to make a cheap, uſeful pipe-drain, never before made public.

THIS is a very uſeful drain for wet or clay land, and though cheap and ſimple, will be found upon trial to be of as great utility, as were ten times the money or labour expended in French-drains, which are generally made by gentlemen, who with the ſtrength of men and money, may do great things; but it is my endeavour, and I hope I ſhall not altogether fail in my purpoſe, to ſupply the farmer with ingenuity, in order to be in ſome degree equivalent for theſe powerful arguments.

I have two ſorts of theſe pipe-drains, one I ſpeak of in the third volume, page 342, to which I refer my reader, but that is only for meadow or graſs grounds.

This following ſort may be applied more generally for every ſort of land, whether ploughing or graſs.

The firſt thing that is to be done is to examine where the fall for the water lies, this is eaſily perceived by the outſide drain which incloſes the field, for in the loweſt place the water generally ſtands, it being the beſt leveller; into this all the pipe-drains muſt lead.

The way to make them, is firſt to plough a furrow along every place where you intend the drains to be, then be provided with a ſort of a ſpade, (all iron except the ſhaft) it muſt be made like a garden ſpade, only that the mouth or digging part, from where you ſet the foot down to the point, muſt be eighteen inches long; at the ſhoulder where you ſet the foot, it muſt be eight inches broad, and go narrower all the way to the point, which muſt only be two inches broad.

With this you make a grip in the

ploughed furrow, which together with the furrow, will be about two feet deep, and the bottom thereof two inches wide.

In performing the work, you need not cut down the ſides, but put the ſpade plum down and leaver out the earth; in this caſe you never put down the ſpade, but you bring it up full.

There will be ſome looſe crumbling bits fall to the bottom; but as no common inſtrument can go to ſhovel them out, you muſt be provided with one on purpoſe, which is made in the nature of a gouge, the mouth of which muſt be two inches diameter; it muſt be put on a ſhaft the ſame way as a turnip-hoe.

With this you draw out the looſe earth, by running it on the bottom of the drain. I call this a ſcoope-hoe.

The drain being thus made, you muſt be provided with ſticks or thorns of any ſort which lie lengthways in the drain, filling it about half way to the top, then ſtrew over them any ſort of ſtraw, ſtubble, or bad hay.

Over this throw a little mold; then go with the plough, and turn the ſame furrow back into its former place, which finiſhes the work.

The whole may be done for about a penny a perch, and I will anſwer for it to perform the office in carrying off ground ſprings, or any downfal of water, as well as any French drain that will perhaps coſt a ſhilling a perch, provided you keep up to the rules laid down; but if you exceed in the width, it is not ſo well, becauſe a greater weight of earth, and a wider bearing would naturally bear harder upon the ſticks and cloſe them more, than when the bearing and ſhoulder are narrow; in this caſe very little weight comes upon the ſticks, and when the earth comes to be conſolidated, by treading upon it cloſe, and fits like a wedge, ſo that after many years, when the ſtalks are rotten, the currency of the water will keep the tube open for a long time.

The narrowneſs of theſe drains (may upon a curſory view) ſeem to ſome people, not ſufficient to drain very wet land. Indeed I have often had it hinted to me by gentlemen who received their information only by theory, but experience gained from repeated trials, prove beyond a contradiction, that they are very ſufficient to convey any downfal of rain or ground-ſpring, ſuch as generally are found in wet ſpewy land, into the ſide drains.

Eſſex is as low a cold clay country as any in England, a gentleman there of my acquaintance had a low wet farm that he let for ſixty pounds a year, the farmer broke upon it.

I adviſed him to take it into his own hands, and drain it after this method, which he did; the land was chiefly grown over with ruſhes, therefore only a low rent, which was about eight ſhillings an acre.

The landlord began to make pipe drains at Michealmas, when the farmer left it, and as the work was eaſily done, it was finiſhed by the ſpring-ſeed time. He made the drains about a perch diſtant from each other; all the ſtubble land he ſowed with oats, which was the earlieſt and beſt crop in the neighbourhood, owing to the land being ſo dry, that he could go to work earlier in the ſpring then his neighbours. In ſhort he made ſo great an improvement, that he told me ſince, he let the ſaid farm for eighty pounds a year.

The method of making French drains, is to dig a trench two or three feet wide, and as many deep, then half fill it with looſe round ſtone, after which cover them with ſtraw, then throw earth over all, till it is level with the reſt of the ſurface.

CHAP. XXV.

On twelve different ſorts of wheat.

FIRST, Red Lammas,
Second, White Lammas,
Third, Red-bearded Wheat,
Fourth, Red Kentiſh Wheat,
Fifth, Long-ear'd Wheat;
Sixth, Grey Pollard,
Seventh, Great-bearded Wheat,
Eighth, Summer Wheat,
Ninth, Double-ear'd Wheat,
Tenth, Yellow Lammas,
Eleventh, White-ear'd Wheat,
Twelfth, Egg Wheat.

With a great many others not worth ſpeaking of, being like ſome of theſe, chiefly ſimilar variations and not diſtinct ſpecies, neither are ſome of theſe worth a farmer's notice. The two firſt are ſuitable for any land in the north of England, Scotland, or Ireland; and the beſt farmers in England prefer them to any other, being, as they call them, the kings of wheat. Indeed, I take the white Lammas to be the hardeſt of the two, and moſt ſuitable for cold land; but the red is the faireſt flour and thinneſt skin and a good yielder.

The ſummer wheat is an early kind, for if it be ſown in February, it will be as early as others that are ſown in autumn, therefore might be uſeful if the firſt ſhould miſs.

The next in value to Lammas wheat is the long eared wheat; this is a very great yielder, and a hardy kind, that will anſwer very well for the cold heavy lands of Ireland, and north of England. I have had great crops of it, but it muſt be ſown thin, as it ſtools much, and when thus thin ſown will produce an ear ſix or eight inches long. It is of the bearded kind, which annoys birds ſo, that they cannot prey upon it with pleaſure, therefore preſerves itſelf; and I think it as good, if not preferable to any other for the north of Ireland, where the land is cold, ſtrong, and coarſe.

The egg-wheat will anſwer well in the ſouth of Ireland, or in England, where the lands are light and ſandy: it is a tender, thin skinned grain, and produces a very fine flour.

The Kentiſh wheat is a good ſort, and very near a-kin to red Lammas: any of the other ſorts of wheat may grow here, though not with that ſucceſs. Were I to enlarge as much upon every different ſort, I ſhould ſwell this work beyond my firſt intention; therefore ſhall confine myſelf to what I have already ſaid, being the moſt proper for theſe kingdoms.

By this chapter being miſlaid, it does not come in its proper place, as it ought to have ſucceeded the firſt chapter in the ſecond vol. which is upon wheat; however it can be attended with no other inconveniency, than not to be ſo eaſy to find perhaps.

CHAP. XXVI.

A hint humbly offered to the Legiſlature, of the misfortune of incloſing town-fields, and adding farm to farm.

A Town-field conſiſts of ſeveral hundred acres, perhaps without hedges, ditches, or other fences, to divide one man's land from another; tho' a hundred farmers may have land in the ſaid field, yet none will have perhaps above one, two, or three ridges lying together in one place, but alternately mixed or interſperſed thro' the field; inſomuch that a farmer (in many places) has no way to know his own ridges, but by cutting the firſt letter of his name, or ſome figure, in a bit of graſs at the end of his ridge; and in order that one ſhall not encroach on or ſteal from another with the plough, they meaſure the breadth, as every man's ridge is of the ſame ſize, or width, whether they be rood, half-acre, or acre ridges, they being generally laid down with ſome proportion of meaſurement.

The reaſon they are thus laid out and intermingled in ſmall parcels, was, that each perſon ſhould have his chance of good or bad land, as it might vary in one of thoſe large fields; therefore an equality was very neceſſary in dividing the lands of England when it was firſt peopled, and happy it has been for her inhabitants that it has continued ſo long.

Moſt towns have five of theſe fields, of which one will be fallow, another wheat, another barley, another beans, or peaſe, and another oats. Every year the farmers take care never to ſow one ſort of grain twice together in the ſame field, keeping alternately changing, ſo that one is a preparative for another, and each field gets its regular fallow every five years, and thus they are kept in tillage from generation to generation.

Each farmer is obliged to concur with his neighbour in this regular courſe of tillage, particularly in the fallow and winter crop, as the fallow-field is common for the cattle all the fallow-year; on which a great many ſheep are kept, that, I may ſay, weed the fallows, for they pick up ſcutch-graſs and other wild roots every time it is ploughed. Likewiſe the wheat-field is fenced in at Michaelmas: whereas the fields that are to be ſown with ſpring-corn may be kept open till April.

A farmer may ſubſtitute in the place of any crop one of his own chuſing, provided it ſtand on the ground no longer than his neighbours, as they keep a regular time of laying their fields common to the cattle, and fencing them in when each crop is ſown.

There are ſome towns that may have only three or four of theſe fields; if this be the caſe, they fallow the oftner, and are confined to fewer ſorts of crops; but of late years, they have found a good method of ſowing turnips in the fallow-year; in this caſe they begin to plough the ſtubble under as ſoon as harveſt is in, and keep ploughing for a winter-fallow till Midſummer following; then ſow turnips, and eat them off by April; then ſow barley, after barley beans or peaſe, after theſe, wheat, after wheat, oats, and again begin with turnips; thus they get a valuable crop and fallow the ſame year. This is a great improvement in husbandry to ſuch towns as have adopted it; but I find this is far from being ſo general as it ought in England.

My Iriſh, and indeed ſome of my Engliſh readers, may think it a ſort of a harſhip for theſe farmers to have ſuch ſmall parcels of land, thus intermixed, and not at liberty (altogether) to occupy or incloſe them as they pleaſe: nay, in ſhort, ſome of the farmers who hold the ſaid field-lands, are ſo much diſſatisfied with their lot, that they have applied and obtained acts of parliament to incloſe their ſaid fields (which will, in the end, have a bad effect); for I ſee this in quite another light, and ſhould conſider it rather as a misfortune, were all the town-fields in England incloſed; for if we conſider tillage in its moſt truly deſerved light, we ſhall find thoſe in the countries where it moſt flouriſhes to be the moſt rich, happy, and independent people.

In ſhort, a corn-country gives bread for people of all denominations around it, and work and bread enough for all the poor within it; it is from theſe open-field countries in England where moſt of the corn is raiſed, that London, and other great and foreign markets, are ſupplied.

But were thoſe fields incloſed, in inſtead of corn, the land would be ingroſſed by rich farmers, and turned into graſs, then conſequently corn would be ſcarce and dear, and the poor would want both bread and work. I know this to be already the conſequence where ſome fields have been incloſed of late years.

If the ſaid lands be kept for tillage, it is plain they are in a better ſtate than if incloſed in ſmall fields, as corn never grows better then in an open expoſure, not to ſpeak of the loſs of ground taken up in the ditches, &c. But whilſt the land is kept in the open town-fields, the farmers are obliged to keep them in a regular courſe or ſucceſſion of tillage.

Again, let me remark, that theſe open town-fields are a great ſpur to improvement in husbandry.

How often have I heard farmers make their remarks in paſſing theends of perhaps two or three hundred ridges of corn belonging to as many people, and ſay, John ſuch-a-one's corn is good, he has a good ploughman, and has managed well; when perhaps the next ridge belongs to a worſe manager, therefore they immediately cenſure him thus: Thomas has managed bad, his ploughman is bad, or he has not ſown it right, or rolled, or weeded, or wherever the fault is, it is ſure to be found out and condemned by the ſharp-eyed neighbours, and the owner ſhamed into a better manager; ſo that, in ſhort, it fires every one with an emulation to outdo each other, and even extends itſelf to the very ſervants.

With what pleaſure have I beheld two or three hundred teams ploughing in a field, every one ſtriving to ſhew the beſt work after him! How often do they make wagers (of perhaps a few quarts of ale, or the like) which is the beſt ploughed ridge, their maſters to be the judges?

Thus they ſtrive to excel each other through the whole branch, as who keeps their teams in beſt order, and beſt geared; who ſows beſt, ſo that the corn comes up eveneſt after them; who mows beſt, by leaving the ſtubble even cut,

&c. who makes handſomeſt ſheaves; who makes handſomeſt ſtooks, or has the feweſt ſheaves blown down after a high wind; who makes the handſomeſt loads of corn upon a waggon; for if a load falls from the waggon before it arrives home, the loader forfeits ſomething at the harveſt-ſupper; alſo if a driver overturns a waggon he forfeits a gooſe at the harveſt-ſupper.

They often make wagers likewiſe, which team will draw the largeſt weight, alſo which is the moſt dextrous driver. To prove this, they will lie a tenpenny nail in a turn in the road, and he that drives the waggon-wheel the trueſt over it, is proved the beſt driver; and then the ricks of corn in the hag-yard are a ſtanding witneſs all the winter, who is the beſt ſtacker.

Again, if a farmer (more curious than common) introduce a ſtrange crop on one of the ridges in this town-field, there is immediately a jury of farmers over it;

and if in the end it prove of utility, it becomes general, as their lands are all alike, not ſo much as a hedge or ditch to part them.

In ſhort, I know not whether theſe town-fields may not inflame the ſpirit of improvement equal to a premium, ſince there may be the ſame ambition of excelling in one as another, as well in the little as the great word; ſo that, I believe theſe town-fields are the greateſt ſpur to improvement of any that could be invented, which every judicious obſerver muſt admit. For my part, I ſhould think it a bleſſing to Ireland, if all or moſt of the land in it were divided in theſe town-fields, as it would certainly put a ſtop to thoſe monopolizers of land. What a pity is it that ſome method is not found out to prevent ſo growing an evil! I knew ſix graziers, (one of which indeed is lately dead) farmed upwards of 12,000 acres; moſt of it ſince his death is let from 20 s. to 25 s. per acre; and the other five graziers were computed to hold from 25 to 30,000 acres, worth at leaſt as many pounds or guineas a year.

It was in this country the Whiteboys have been ſo outrageouſly daring and miſchievous of late years; and indeed it is not much to be wondered at, for theſe ingroſſers of land are ſtarving them out of the country.

I know the country very well, and am acquainted with all or moſt of the graziers in it; and from diſcourſes I have had with them, found that they were all ſenſible of the bad conſequences attending ſo much land being in the hands of a few men: but no one can be blamed for doing the beſt he can for himſelf and family, ſince he is not tranſgreſſing the

This is all natural on both ſides; ſelf-intereſt is the firſt law of nature, and the weakeſt muſt go to the wall, as the phraiſe is; but be aſſured the end will be fatal, and it is coming very faſt. In the courſe of my time, I have ſeen the growing evil as plain as I ſee the paper before me: but were we ſecure from invaders, and could we make our bullocks defend our iſlands (when diſpeopled of all but their maſters) with their horns from all enemies, yet it would be true policy to keep our country as well peopled as we could, as a kingdom's riches conſiſt in the multitude of its people; for bullock cannot eat bullock, neither does meat eat well without bread. Theſe are conſequences that ought to draw our attention, were we diveſted of all humane

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However, I would not be underſtood to condemn the graziers of unnatural inhumanity, or hardneſs of heart towards the poor; no, that would be doing them great injuſtice. I know a great many that have helped to ruin their country by holding great tracts of ground, and believe them to be as good men as are generally going in the world. It is none of their fault, the evil grows upon them inſenſibly; it is as natural for a grazier to lay farm to farm as his capital increaſes, as it is for a merchant to add ſhip to ſhip, trade to trade, wealth to wealth, till it amounts to what is called a plumb, which is an hundred thouſand pounds. In ſhort, it is nearly alike, though the conſequence is different; for the merchant is enriching his king, country, and ſelf, at ſame time; but the grazier, to enrich himſelf, both weakens and impoveriſhes his country, by transforming the human ſpecies into brute beaſts as it were.

Again, it puts a final ſtop to improvement; becauſe a gentleman-grazier holds ſo much lands in his hands, he finds himſelf buſineſs enough to manage it by ſtock, without being at trouble to till or plough his heathy, lingy, barren land. Supoſe a grazier holds under ſtock four thouſand acres, he need keep no more than four families as herds and ſhepherds; ſuppoſe five perſons in each, is only twenty in all.

But if the ſaid four thouſand acres were under tillage, and occupied by farmers at one hundred acres each, it would keep forty families well at five in each, which would make two hundred people; therefore the difference is as two hundred is to twenty.

The above are the troubles that Ireland at preſent labours under, and which have been to my knowledge, growing upon her theſe twenty years paſt. And I am afraid the contagion has reached to South and North Britain; for there I ſee the farmers are adding farm to farm, and turning graziers, ſo conſequently neglecting to raiſe the ſtaff of life; which is one reaſon that the kingdoms are ſo thin of grain, and the poor ſo diſtreſſed for work and bread, particularly in the moſt graſſey countries.

Then ought not England to take the alarm, and enact a law, to put a ſtop to the growing evil, by limiting the ſize of farms to at moſt four hundred acres; ſuch a limitation would prove a greater ſpur to improvement, than when a farmer has more then he can well manage.

The legiſlature, inſtead of putting a ſtop, is adding to the evil, by conſenting to ſo many acts of parliament, for incloſing open town-fields, and omitting to make ſuch laws as would redreſs his Majeſty's poor ſubjects. I often wonder how it is poſſible for the legiſlature to overlook ſo many wholſome laws as might be made; but it is in this as in moſt other caſes, what is every body's buſineſs is no body's buſineſs.

And on the other hand, the high ſtations and fortunes of theſe gentlemen place them above the general knowledge of grievances: their knowledge is moſtly from the precarious information of ſome favourites perhaps, who generally tell a plauſible tale as they would have it to paſs.

It is a pity that a gentleman, before he takes a ſeat in the houſe of commons, does not take a tour thro' his Majeſty's dominions, and make himſelf well acquainted with the conſtitution of her commerce, and grievances of her people.

It is natural for a maſter or employer, through all the ſtages of life, to be acquainted with the abilities of thoſe he employs, and whether or not they be qualified for the truſt he confides in them; then certainly this, which is one of the moſt important points, a point on which the happineſs or miſery of ſo many people depends, ought to be attended to with the moſt judicious inſpection.

Thoſe that are placed in this ſtation, ought to be every thing that is great and good: to be a good commoner, he muſt be honeſt hearted, a lover of his king and country; he ſhould not be a ſtranger to his own country, as is too often the caſe with gentlemen that travel abroad, who being asked about the conſtitution or commerce of their native country, can ſcarce give a rational anſwer; therefore to be well acquainted at home, he ought to travel three or four years through his Majeſty's dominions.

He may think this is more than needs, but I aſſure him not; for I have been travelling in them theſe thirty years, and yet I can find ſomething new, that would be worth a commoner's attention.

Adding to all this, he ſhould have the patience of Job to hear all debates, the wiſdom of Solomon to judge of them, and the reſolution of St. Paul to plead in their behalf, and dare to be honeſt in the worſt of times to his king and country: neither ſhould he be too proud, and diſtant to his conſtituents, but condeſcend ſometimes to keep them company and hear their advice; and let him be aſſured, that he will hear as ſound mother wit under a plain as a laced coat, though perhaps not ſpoke with ſuch eloquence of ſpeech.

CHAP. XXVII.

A few hints humbly offered for the peruſal of the Legiſlature, relating to a dog act, &c.

THOUGH I am no great politician, yet I wiſh ſo well to the conſtitution of England, that ſo far as I am capacitated, would moſt willingly lend a hand, to point out any laws that might be of utility to it's inhabitants.

And what more particularly encourages me to undertake the task is, becauſe the county from whence my work takes it's birth (I mean Yorkſhire) happens to be repreſented by worthy, ſpirited, independent gentlemen, who have the intereſt of their country at heart, and have alſo abilities and induſtry enough, to ſtir up and inforce any ſcheme, that may appear for their country's good.

I therefore flatter myſelf, that they will undertake the procuring ſo many of theſe acts, as may appear worthy their notice. And I farther flatter myſelf, that ſuch of my readers as are impartial, will think with me, that a dog act would would be of great utility to the publick, which may appear more conſpicuous, upon reading the immenſe ſums it would ſave to the induſtrious part of mankind, and alſo the great revenue it would raiſe to the puplic funds, out of the pockets of none but ſuch as could well ſpare it, as any one which found himſelf oppreſſed, could eaſe himſelf by parting with the cauſe thereof.

Secondly, it would lop off a great many uſeleſs animals, and ſuch as are of benefit would be preſerved for their merit, and the owner's intereſt. Neither ought a poor man to keep a dog, if he be not well able; it is inhuman to keep any dumb animal to ſtarve, which many muſt, did they not eat the poor children's bread and butter, or turn out to worry ſheep.

It is always allowed that what will keep a dog will keep a pig; and I think I need not ſay which would be found the moſt profitable to the poor man's family at Chriſtmas, a dog for his children to play with, or bacon to fill their bellies.

I may be asked, why cannot a poor man ſee theſe follies himſelf? I anſwer, no, becauſe fore-caſt does not always get the better of folly; in this no more then in every other degree in life; there is a natural tenderneſs and indulgence in every parent towards their children, as well as in ladies for their lap-dogs, pardon the compariſon.

Thirdly it will appear that there will be yearly, at leaſt a million of money ſaved, that will center among the pooreſt ſort of individuals, and alſo 250,000 l. will go to the public funds, out of the pockets of the abler ſort.

In order to reduce this to ſome ſort of certainty, it may not be amiſs to make a computation how many dogs may be in England, (and upon ſuch an act paſſing) how many uſeful ones may be kept to pay tax, and how many of the reverſe, deſtroyed for a ſaving; this cannot be done better then by firſt making a computation how many people are ſuppoſed to be in England.

In this authors differ in opininion, as much as from eight to twelve.

Some writers compute eight, ſome nine, ſome ten, ſome eleven, and ſome twelve millions; but if we may judge from appearances, and if there were nine millions a century ago, I apprehend there cannot be leſs than eleven now.

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There is nothing that can give a better idea of the increaſe of people, than the multiplying of new houſes, neither is there any one object that attracts the eye of a traveller or dwells upon his memory more, owing perhaps, both to the largeneſs of the object, and to the taſte of building in the preſent times.

Few men have travelled more in England than I have done, and I have made my remarks very minutely, which upon looking over, and comparing my journal with all the obſervations and computations I can make, I am clearly of opinion that there are daily a great increaſe of people.

This may occur to any one who lives in any partof the kingdom, if he only takes notice of the many new houſes that are daily building in every town and city, together with all the farm houſes and gentlemen's ſeats, that are ſtarting up in the middle of every new incloſure, that are very rapidly going on in all parts of England.

Neither are there any houſes that ſtand long empty, but are immediately tenanted.

Were not this the caſe, architectures, or proprietors, would ſoon ſtop building, but it is the great demand, that makes them puſh forward the work with ſpirit.

A family may be compared to a ſwarm of bees, that when the young ſtock grows up, they muſt depart from the hive; for when the eldeſt ſons or daughters marry, (whether of tradeſmen or farmers) they generally turn out to a new habitation; and it is the youngeſt that moſtly ſucceeds the old people in the old houſe.

All this ſhews that tho' a great deal of people daily go abroad, yet we are greatly increaſing in number. But in order to come as near the truth as poſſible, I will ſtrike a medium, and ſuppoſe England and Wales to contain ten millions of ſouls.

Some will compute five, and ſome four people in a family, but to avoid fractions, and to make the tote up come as near to a certainty (on the right ſide of the queſtion) as poſſible, ſay, five people to a family.

This makes two millions of families, and I think we may juſtly compute one dog to each family, as there are more families that have two or three dogs in them, then are without, not to ſpeak of gentlemen that keep hounds, which has perhaps more dogs than people.

Therefore I ſay, we may almoſt with certainty, ſet down at leaſt two millions of dogs in England.

The next queſtion is, what each dog will take in a year to maintain him, which I think we may juſtly ſet down twenty ſhillings, for if a gentleman ſends a whelp into the country to be reared he never pays leſs then half a guinea or fifteen ſhillings till he be half a year or three quarters old, and ſometimes a guinea, except he ſend him to a tenant which is under an obligation to him, in this caſe he pays perhaps nothing, but then the conſumption is no leſs, for the dog eats the ſame as if paid for.

As to gentlemen's hounds, grey hounds, pointers, and my lady's lap-dogs, they coſt a great deal more.

We will ſuppoſe pug only to deſtroy one pound of meat in the day, reckoning bread and butter, tea, roaſt beef, or what is ſtirring, and call that only three-pence, though ready dreſſed, and without bone (becauſe it would be very imprudent to give poor pug bones to break his teeth). Now three pence per day will be found to amount to four pounds eleven ſhillings and three-pence a year.

This to be ſure is nothing in a lady's pocket, no more is dirtying or wearing her aprons, &c any great matter, becauſe ſhe can mend them herſelf, which ſhews houſewifery.

But though ſuch things be not felt by people in affluence of fortune, yet be aſſured it hurts the public in general.

Greater the conſumption is, and higher the price in the articles thereof; and a halfpenny or a farthing in a pound, in either meat or bread, is very ſenſibly felt by the lower ſort of people.

If two millions of dogs conſume annually, twenty ſhillings each, the ſum amounts to two millions of money. Suppoſe an act of parliament to paſs, that each dog ſhould pay five ſhillings yearly, the ſum would amount to five hundred thouſand pounds a year.

But upon ſuch an act taking place, we

will ſuppoſe all the uſeleſs dogs deſtroyed, and tax paid only for ſhepherds dogs, farmers houſe dogs, and gentlemen's dogs, which might perhaps reduce the number to one half, that is one to every two families; then the ſum raiſed would be yearly, two hundred and fifty thouſand pounds, to go into the public funds, which would all go from the pockets of ſuch as would be well able to pay it; and as I obſerved before, if any one found himſelf oppreſſed by the tax, he could quickly eaſe himſelf by diſpatching the dog.

The ſaid million of uſeleſs animals that would be put away, reckoning each to deſtroy twenty ſhillings worth of victuals every year, this would be a ſaving to the nation one million of money, and this too from thoſe of the pooreſt ſort.

Though theſe calculations are only gueſs work, yet the probability is ſo great on their ſide, that it almoſt amounts to a certainty.

Perhaps ſome of my readers may imagine that I have ſome intereſt in writing upon this ſubject, but I will aſſure them I have not; ſo far from it, that were ſuch an act to take place, I ſhould in all probability pay for two or three dogs, being very fond of thoſe animals, ſo far as they are uſeful, but have no notion of keeping a parcel of yelping curs, for no other uſe than to eat the poor's bread, bite horſes heels, worry ſheep, run mad, &c. And ſince we cannot defend ourſelves and reſt ſecurely at home, without a reſpectable ſtanding army, and ſince that army cannot be raiſed or paid without money, and money cannot be raiſed without taxes, let them be levied upon ſuch ſuperfluous articles as reaſon clearly ſhews is moſt for the public good.

Was this act to paſs, and each dog to pay five ſhillings a year, there is no doubt but this would raiſe a fund of at leaſt two hundred and fifty thouſand pounds a year, which though very conſiderable, is nothing in compariſon of the great ſaving, which could not be leſs than one million pounds ſterling per annum. Any ſaving plan inforced by an act of parliament is indiſputably as beneficial to the public, and reflects as much honour upon the member that promotes it, as one which brings in money to the public funds: and ſuch a dog act would be found to do both.

CHAP. XXVIII.

Shewing how advantageous it would be to the public, was an act paſſed for one ſtandard of weights and meaſures to be obſerved through the kingdom.

ONE would think, that an act for one ſtandard of weights and meaſures through the kingdom, is of ſuch a tendency, and ſpeaks ſo plain for itſelf, that it could meet with no oppoſition, that let who would carry in a bill it muſt paſs the houſe nem. con. and yet a thing of this ſort has been moved for and rejected, which muſt ſurprize every well meaning man.

Any one that ſays againſt this act I ſhould ſuſpect for ſome foul play in preying upon either buyer or ſeller, or perhaps both, by having acquired the knowledge and art of traffic between one county and another, where weight and meaſure varies, therefore, by a prevaricating, deceiving, artful cunning, he deceives the public by his vows and proteſtations that it coſts ſo much, therefore muſt have ſo much. This is a thing eaſily done, as for inſtance:

A buſhel of corn in ſome parts of Cheſhire and Lancaſhire contains from thirty-eight to forty-two quarts, whereas in other parts it is Wincheſter meaſure only, ſo that the difference in meaſure muſt leave a great profit to the dealer.

Butter is another article that varies much in weight, even in the ſame market, as none can bring leſs then ſixteen ounces to a pound, ſo none ought to bring more, though ſome bring twenty, or twenty-two; but this is as unfair and as deſigning, as thoſe that bring leſs, becauſe they ſell not only accordingly, but ſometimes higher in proportion

Such things lead people aſtray in forming a judgement how things ſell, and make the markets uncertain. Some people muſt be impoſed upon, for it is natural for a ſeller, to ſay ſuch a one ſold for ſo much, therefore I will have ſo much, though perhaps their is one fourth or fifth of the money difference in the weight or meaſure.

In ſhort, the thing is ſo glaring a miſfortune through the kingdom, that I wiſh an act was paſſed for one ſtandard of weight and meaſure through England and Wales; and he that ſells more, ſhould be equally culpable with he that ſells leſs.

* * *

CHAP. XXIX.

On an act for a general uſe of broad-wheel'd waggons, two to roll within two

WHatever my farming readers may think of my ſcheme in promoting the three foregoing acts, I am ſure I ſhall have a great many of ther diſapprobation in this.

Some ſenſible men perhaps here and there, may ſee the thing in its true light, but I doubt they are thin ſtrewed; for I know the major part will be my enemies in it.

However, be this as it will, I am ſo ſanguine in my expectations, that I ſhall puſh it on with all the intereſt I have; and for my pains, I hope to have the pleaſure of travelling in far better roads than ever was known heretofore.

My opponents perhaps may be as blind in this affair as they were formerly, when turnpikes were firſt introduced; but it is poſſible to force them into their own intereſt againſt their wills.

The preſent uſe of broad-wheel'd waggons are certainly very uſeful, but it is only half doing the work; their utility ſo far, may give us an idea what might be expected from a general uſe of them, but as the thing ſtands, it is juſt like ſetting two horſes to pull contrary ways, tho' both want to have the load to the ſame place; becauſe the narrow-wheel'd carriages cuts the road in ſuch a form, that in ſome places it is almoſt impoſſible for broad wheels to paſs in it.

At firſt when the act paſſed for broad-wheel'd carriages, it was thought too oppreſſing to oblige the farmers all at once to come into it, by a general act, as the expence was looked upon to be too great for many to bear; but now the caſe is altered, for a great many of the moſt ſenſible ſort of them, have come into it of themſelves, and ſome upon eaſy terms too, by making their former waggons or carts do without any other alteration, than adding a ſet of felleys at each ſide of their former wheels, with bolts to go through the three felleys to bind them together.

The two additional felleys, being each three inches broad, and the old felley three inches, all compleats the wheel at uine inches. This is a very good way, and very often practiſed now-a-days, particularly when farmers want to go into their grounds, then they make broad wheels to prevent cutting the ſod; ſome has them put on and taken off occaſionally.

Now ſince the moſt ſenſible farmers are creeping into this method, and ſtill would more, were they not prevented by bigotted ſilly ſellows, perſiſting in drawing narrow-wheeled carriages, which cuts up the road, and makes it impoſſible for a broad-wheeled carriage to go thereon.

As nature has not given every man talents a like, and as it is hard for the induſtrious ſenſible man to ſuffer through his neighbour's folly or ignorance, it is no more than right for the legiſlature to enforce an act to bring ſuch ſtupidity into reaſon, both for their own and the public good.

Should any ſpirited member take this in hand, it would be well done, to draw up a bill for every ſort of four-wheeled carriage to roll two within two. The act to run thus:

That every waggon and cart wheel ſhold be nine inches broad; that the fore-wheels of the waggon ſhould roll four feet nine inches wide within the rim or felley; and the hind wheels roll four feet ſix inches wide from outſide to outſide of the rim.

This would level the road eighteen inches at each ſide, and the little ridge of three inches would be of no hurt, as its narrowneſs would not permit it to ſtand high, or reſiſt the wheel of any carriage preſſing it down, ſo that the roads would be all like a bowling-green for levelneſs. The more carriages of this ſort that would come upon any road, the better it would be.

The wheels of all coaches, poſt-chaiſe, &c. ſhould be four inches broad, and roll two within two, leaving an inch ſpace between the rollers Upon theſe conditions every carriage to draw as many horſes as they pleaſe.

This would put an end to all informations, weighings, and ſuch like troubleſome buſineſs, which are the cauſe of much quirking, prevaricating, and perjury.

In this caſe, every croſs country road muſt be good, becauſe every machine would act as a roller to mend them. The very horſes ſeeting when broke into the ſurface, would be cloſed and leveled again by the rollers immediately following.

I wiſh every one had the ſame trials, and could ſee it in the ſame light that I do, we ſhould then have good roads through every part of the kingdom, without any other expence than a drain at each ſide to take away the water.

The foregoing chapters relating to the ſaid acts, are, I apprehend of great moment to the public, therefore humbly ſubſcribe the peruſal thereof to the legiſlature, and do not deſpair of ſeeing them paſs into the ſeveral laws, with ſuch alterations or deductions as the legiſlature may think proper, for the public welfare.

The END of the FIRST VOLUME.

29.5.06.

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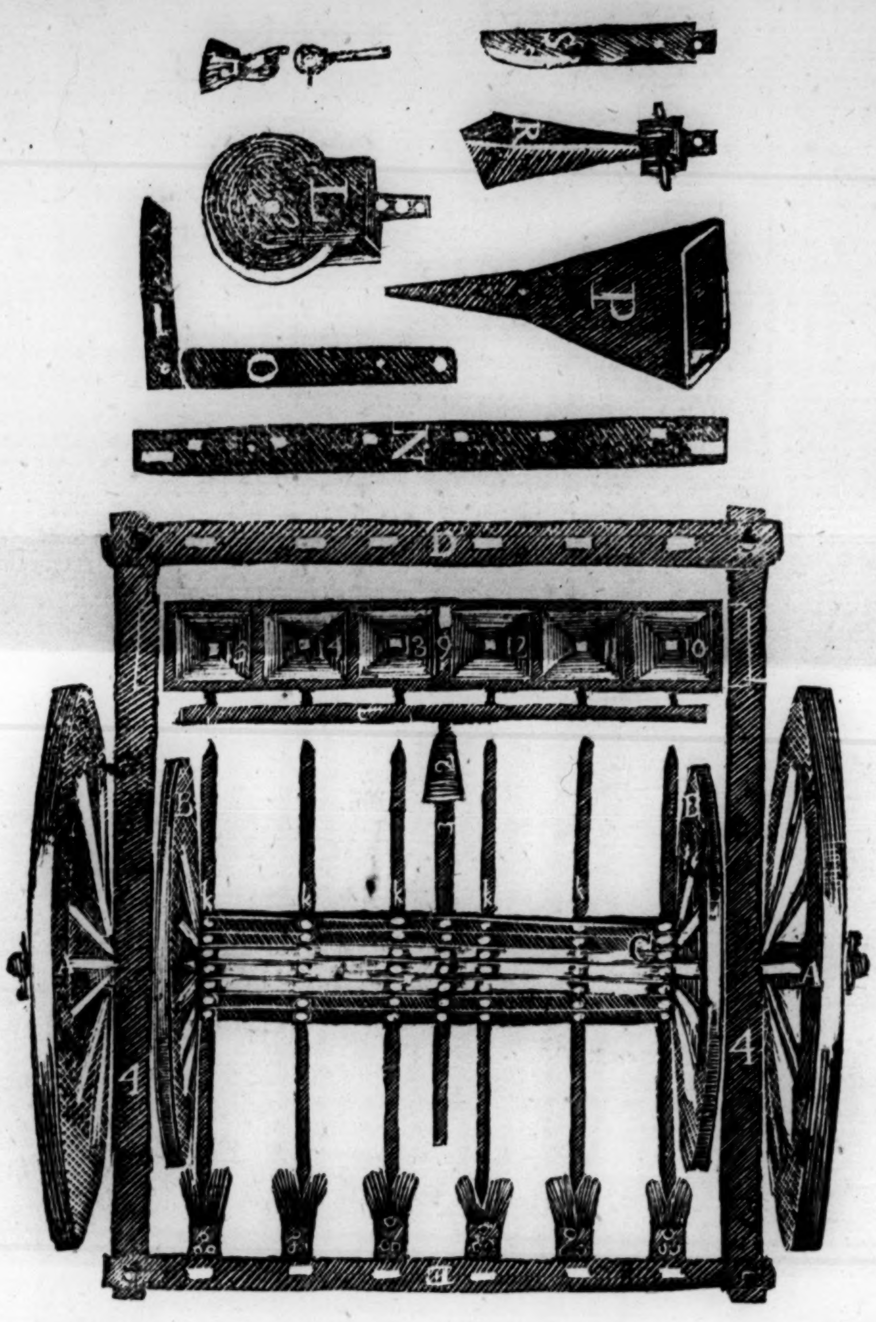

Explanation of the Author's new-invented Machine for the new Method of Huſbandry.

ROLLER C, is five Feet and a Half long, and

The Holes through the ſeed-board, and thoſe in the Slide-board, are oppſite each other when the Machine is ſowing; but by ſlipping the Slide-board about an Inch it ſhuts both Holes, which is neceſſary and done with the Touch of the Finger while the Machine is turning at the End of the Ridge.

The Mortiſe in the Seed-board oppoſite 9, is to admit the Tenon of the Frame in which the ſmall Wheel runs, as ſhewn by L; this Wheel is to bear up the hind Part of the Frame of the Machine, and can be made lower or higher; therefore determines any Diſtance you chuſe the Pipes to ſtand from the Ground.

In the Piece of Wood ſhewn by 7, you ſee ſix ſmall Pins, which go under the Seed-board; theſe are the ſmall Ends of the ſix Tongues which play againſt the Slide-board.

In the round Part of the Tongue goes a Wire about an Inch long, which plays through the Hole in the Slide-board among the Corn, and keeps it from choaking or ſtopping.

This Piece of Wood 7, (together with a Piece of Iron which ſcrews into it, as ſhewn by 3,) preſſes down the ſmall Ends of the Tongues; and as they play upon a Wire in the Middle, the other End preſſes contrarywiſe againſt the Under-ſide of the Slide-board, which is opened and ſhut when the Machine moves by the Iron 3 playing upon the Cog-pins, (which is in the Middle of the Roller) ſhewn by 2.

P, ſhews a Piece of Wood which ſlides along the Ground; it is three Inches thick, but thinned to a Feather-edge, by taking

Explanation of the Author's new-invented Machine for the new Method of Huſbandry.

ROLLER C, is five Feet and a Half long, and twelve Inches Diameter; it has ſix flat Sides, in each are fixed ſix Pins at one Foot Diſtance from each other, as appears by the Holes, ſo conſequently the Number are ninety-ſix: k, k, k, k, k, k, ſhew one Row of theſe Pins, each of which muſt be nineteen Inches and a Half out of the Roller, and then they will ſplay, ſo that the Points will ſtand twelve Inches from each other. If you would hole nearer or farther at a Diſtance from each other, it is only making the Pins ſhorter or longer in Proportion. In each End of the Roller goes a Gudgeon which the Frame 4, 4, lies upon.

The gauging Wheels, B, B, go upon the End of the ſaid Gudgeons, betwixt the Frame and the End of the Roller; theſe Wheels are to gauge the Depth the Pins are to ſink into the Ground.

The Wheels A, A, are put on occaſionally to convey the Machine from Field to Field.

In E, are fixed Standards oppoſite to each Row of Pins, in which are fixed ſix Beſoms to ſcratch the Dirt off from the Ends of the Pins in wet Weather.

In the ſixteen Holes round the Middle of the Roller are fixed Cog-pins, as ſhewn by 3.

10, 11, 12, 13, 14, 15, ſhew the Mouth of the Hoppers fixed in the Seed-board.

P, ſhews one of theſe Hoppers; the ſmall End or Pipe of this Hopper goes through the Seed-board, and near the Surface of the Earth, which, by the Help of the Sliding-board, (as each End runs in a ſliding Mortiſe in the Frame 4, 4) you can move and fix the Pipes of the Hopper over the Holes in the Ground at Pleaſure.

The ſmall Tongue (ſhaped like a Ferula, to which the Hand points) is fixed in a Mortiſe in the Pipe, and the broad End preſſes againſt the Under-ſide of the Slide-board N, oppoſite to the Holes, which Board N, goes under the Bottom of the Seed-board, and through Mortiſes made in the Pipes.

P, ſhews a Piece of Wood which ſlides along the Ground; it is three Inches thick, but thinned to a Feather-edge, by taking the Timber away from one Arredge; there are ſix, and each Tenon goes into a Mortiſe in d; this Coverer plays in a Swivel, as appears by the Cut; this is to gather the Mold over the Seed, and fill the Holes.

O, ſhews a Marker; it reaches to the Middle of the Horſe's enſuing Track, in order to mark where he is to go the next Time; there muſt be one at each Side, becauſe he turns and goes one Time with his right Side, and the other with his left, to the unſowed Ground; that which is not in uſe is brought forward, and laid upon the Shaft; they are faſtened to the Frame 4 by Iron Screws. I, hangs down to trail along the Ground to ſcratch and ſhew the Track where the Horſe is to go.

In E, are fixed two Hooks, on which a Pair of Shafts or Siles (like thoſe of a Cart) goes, by which the Horſe is to guide and draw the Machine.

By taking out the Iron Clapper 2, you may hole without ſowing, or you may omit making the Hopper-board, (in which moſt of the Nicety depends) and ſtill you will find the holing Machine extremely uſeful; becauſe when the Ground is holed, Seed may be dropped into each Hole by Children, Grain by Grain, at a very ſmall Expence, as appears by the Table on this Work; as alſo when you hole the Ground for Tranſplanting, you are not to take Notice of the Seed-board.

The Tables to be put at the Beginning of Vol. I. and this Machine at the End thereof.